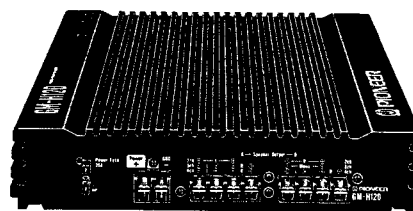


Service Manual

PIONEER
The Art of Entertainment

• GM-H120/UC



ORDER NO.
CRT1377

BRIDGEABLE FOUR-CHANNEL POWER AMPLIFIER

GM-H120

GM-3400

UC

EW

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SAFETY INFORMATION (UC MODEL)

CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5). When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SPECIFICATIONS

• GM-H120/UC

Power source	14.4 V DC (10.8 - 15.6 V allowable)
Grounding system	Negative type
Current consumption	17 A (at continuous power, 4Ω)
Fuse	30 A
Dimensions	264 (W) × 52 (H) × 335 (D) mm [10 - 3/8 (W) × 2 (H) × 13 - 1/4 (D) in.]
Weight	4.9 kg (10.8 lbs.) (Leads for wiring not included)
Maximum power output	60 W × 4/180 W × 2/60 W × 2 + 180 W × 1 (EIAJ)
Continuous power output	30 W × 4/90 W × 2 (at 4Ω, 20 - 20,000 Hz, 0.05% THD) 45 W × 4 (at 2Ω, 20 - 20,000 Hz, 0.05% THD)
Load impedance	4Ω (2 - 8Ω allowable)
Frequency response	10 - 50,000 Hz (+0 dB, -1 dB)
Signal-to-noise ratio	100 dB (IHF - A network)
Distortion	0.003% (at 10 W, 1 kHz)
Separation	60 dB (1 kHz)
Input level	0.2 - 2 V / 8 kΩ

These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.

Note:

Specifications and the design are subject to possible modification without notice due to improvements.

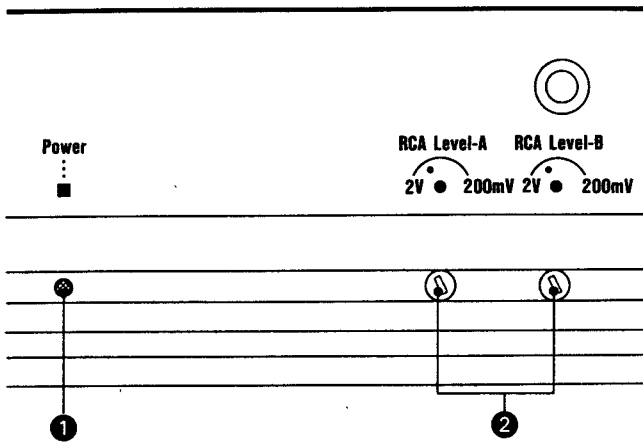
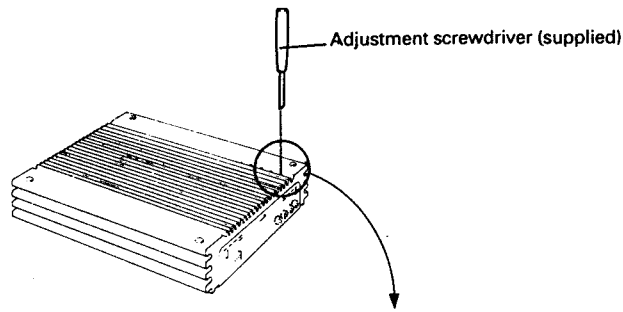
• GM-3400/EW

Power source	14.4 V DC (10.8 - 15.6 V allowable)
Grounding system	Negative type
Current consumption	17 A (at continuous power, 4Ω)
Fuse	30 A
Dimensions	264 (W) × 52 (H) × 335 (D) mm
Weight	4.9 kg (Leads for wiring not included)
Maximum power output	80 W × 4/180 W × 2/60 W × 2 + 180 W × 1 (EIAJ)
Continuous power output	40 W × 4/90 W × 2 (at 4Ω, 20 - 20,000 Hz, 0.05% THD) 45 W × 4 (at 2Ω, 20 - 20,000 Hz, 0.05% THD)
Load impedance	4Ω (2 - 8Ω allowable)
Frequency response	10 - 50,000 Hz (+0 dB, -1 dB)
Signal-to-noise ratio	103 dB (IEC - A network)
Distortion	0.003% (at 10 W, 1 kHz)
Separation	60 dB (1 kHz)
Input level	RCA: 0.4 - 4 V/8 kΩ DIN: 70-500 mV/22 kΩ

Note:

Specifications and the design are subject to possible modification without notice due to improvements.

2. CONTROLS AND THEIR USE (UC MODEL)



① Power Indicator

The power indicator lights when the power is switched on.

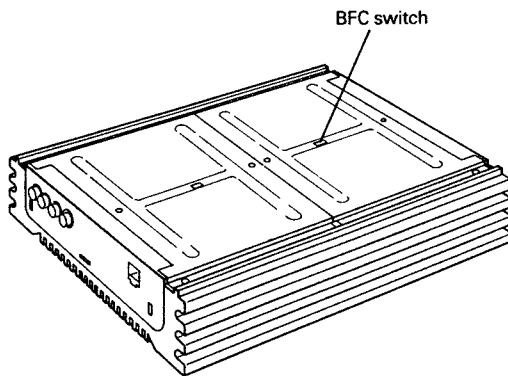
② RCA Input Level Controls A and B

Input level control A is used to adjust the volume of speaker output A; Input level control B is used to adjust the volume of speaker output B. Normally, align the dots • on the controls with the marks. If the output is low even when the volume of the car stereo is turned up, turn these controls clockwise. If there is distortion when the volume of the car stereo is turned up, turn these controls counter-clockwise.

- Adjust controls ② with the supplied adjustment screwdriver. Keep the screwdriver in case you need to readjust the controls later.

BFC (Beat Frequency Control) switch

If beating is heard when listening to AM stations on your car radio, change the position of the BFC switch on the bottom of the amplifier with a small flat-bladed screwdriver.



3. CONNECTING THE UNITS (UC MODEL)

Connect the components as shown in the diagram.

- Before finalizing installation, turn everything on, and make sure everything works correctly and that no noise is getting into the system.
- When routing leads and cords, secure them with cable retainers and electrician's adhesive tape. Also, to prevent any damage to the insulation on the leads and cords, protect them with electrician's adhesive tape wherever they may touch sharp edges.
- Keep all wiring away from hot surfaces or heater outlets to prevent short circuits.
- It is recommended that the speakers connected to the amplifier have the ratings shown below, or higher. If a speaker has a rating below that recommended, it may be damaged when the volume is turned up. The speaker impedance must be 2 to 8 ohms.

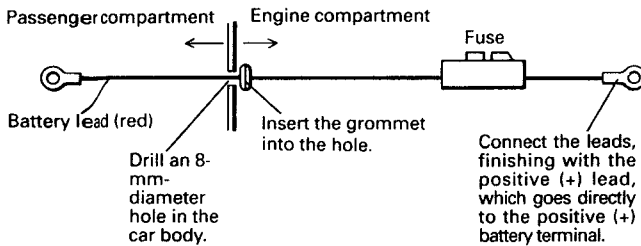
Mode	Speaker ratings
4-channel	Maximum: 60 W Nominal: 30 W
2-channel	Maximum: 180 W Nominal: 90 W
3-channel Speaker output (A)	Maximum: 60 W Nominal: 30 W
Speaker output (B)	Maximum: 180 W Nominal: 90 W

In the case of a full-range speaker, use one whose maximum rating is higher than the maximum rating shown. In the case of a sub-woofer, use one whose nominal rating is higher than the nominal rating shown.

- Never connect a speaker lead to ground or to other speaker grounds. The protection circuitry will operate instantaneously, turning off the amplifier.
- To prevent noise problems, keep the power leads to the amplifier away from the signal cords (RCA cords) and speaker leads. Also, keep the power leads away from any antenna cords.
- Amplifier ground leads (black) should be connected to a solid metal part of the vehicle body. If using multiple amplifiers, connect all amplifier ground leads to the same point to prevent noise problems. To get good contact when grounding, you may have to sand away the paint to expose the metal underneath.
- To operate the amplifier and car stereo properly, connect the battery lead and the accessory power lead (red / black) correctly. If the leads are not connected correctly or are not connected at all, the amplifier and car stereo will not work.

Connecting the battery lead (red)

Route the battery lead (red) from the engine compartment to the passenger compartment to connect it to the amplifier. To prevent a short circuit, do not connect the positive (+) lead of the battery until the other leads have been connected.



Connection of speaker leads and input leads

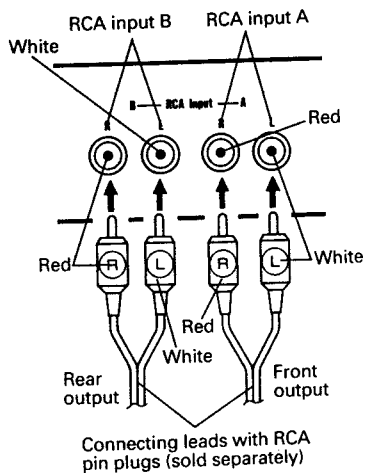
Either 4-channel mode (2 inputs/4 speakers or 1 input/4 speakers), 2-channel mode (1 input/2 speakers), or 3-channel mode (2 inputs/3 speakers) can be selected for the speaker output. The way the speaker leads and RCA input cords are connected depends on the mode used.

4-channel mode, type 1	• Inputs A and B (2 inputs) • 4-speaker (front/rear) output	Page 5
4-channel mode, type 2	• Input A (1 input) • 4-speaker (2 stereo pairs) output	Page 5
2-channel mode	• Input A (1 input) • 2-speaker output	Page 6
3-channel mode	• Inputs A and B (2 inputs) • 2-speaker (stereo) plus 1 speaker (mono) output	Page 6

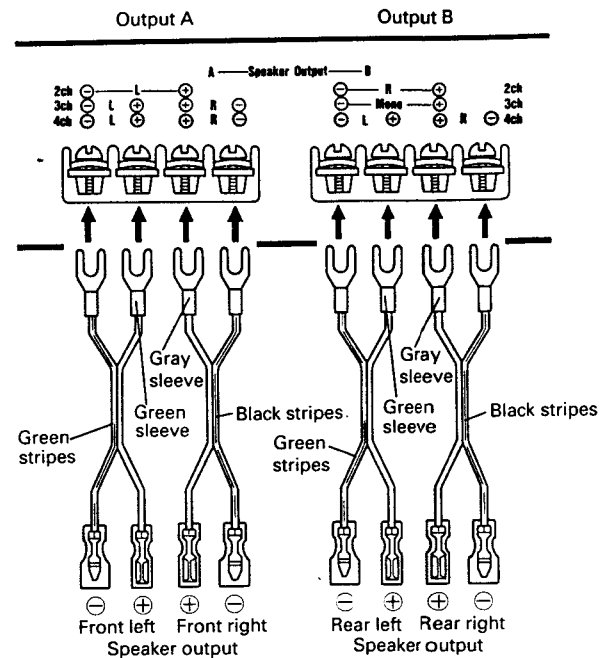
Connection of speaker and RCA input leads when the amplifier is connected to a car component with RCA pin jacks

When using 4-channel mode type 1

(Rear of amplifier)



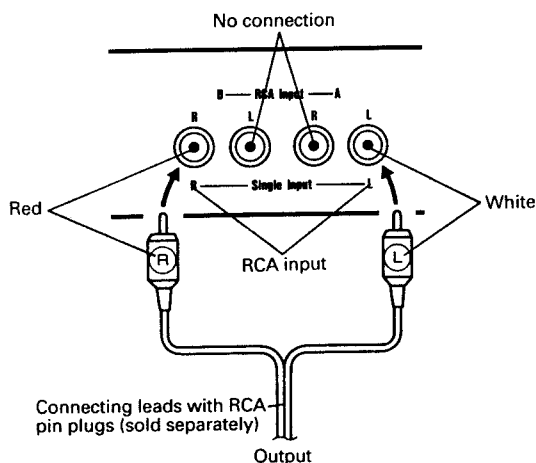
(Front of amplifier)



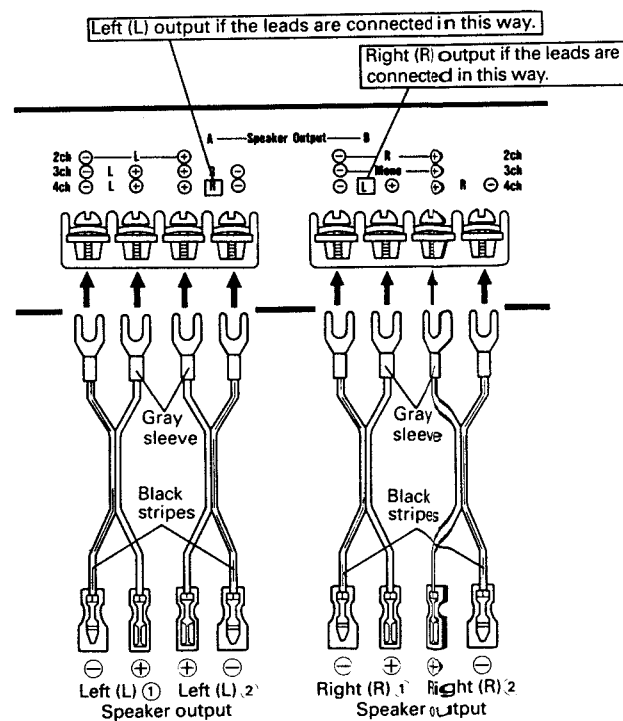
When using 4-channel mode type 2

- With this connection, the left (L) and right (R) positions of the speaker terminals on the front of the amplifier are slightly different from the positions indicated.
- The left (L) ① and right (R) ① speaker leads to stereo output ①, and the left (L) ② and right (R) ② speaker leads to stereo output ② (two pairs of stereo outputs).
- Connect the RCA outputs of the car component to the RCA inputs marked Single Input on the rear of the amplifier.
- If the RCA input levels are adjusted, set input level controls A and B to the same position.

(Rear of amplifier)



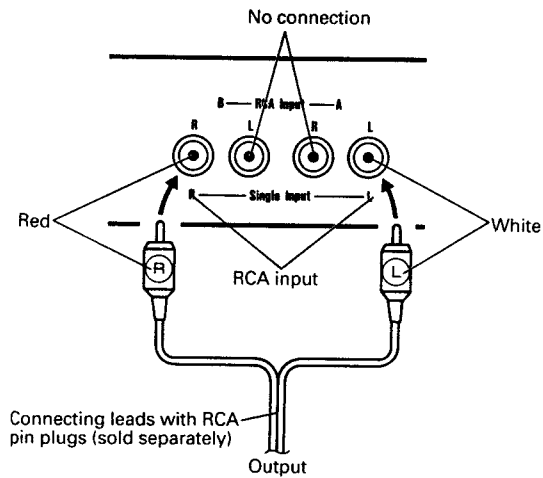
(Front of amplifier)



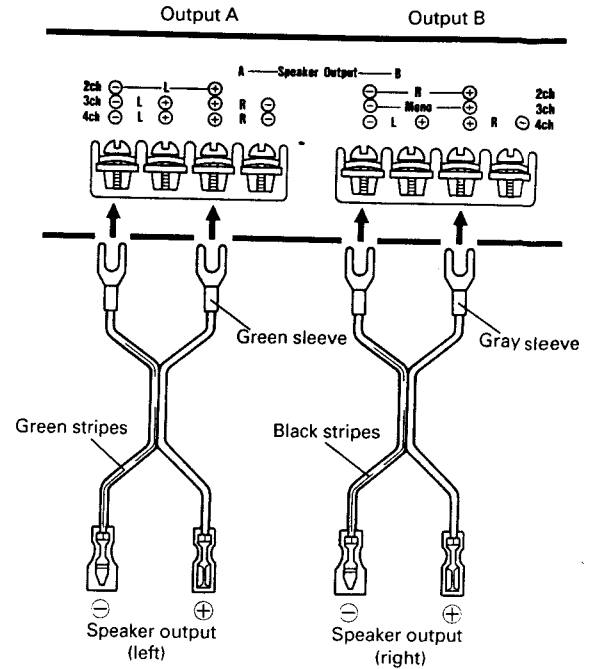
When using 2-channel mode

- Connect the RCA outputs of the car component to the RCA inputs marked Single Input on the rear of the amplifier.
- If the RCA input levels are adjusted, set input level controls A and B to the same position.

(Rear of amplifier)

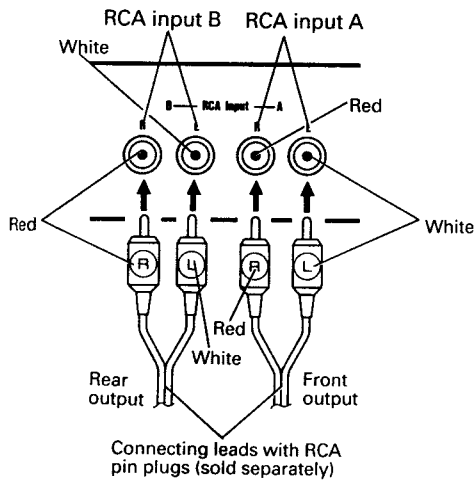


(Front of amplifier)

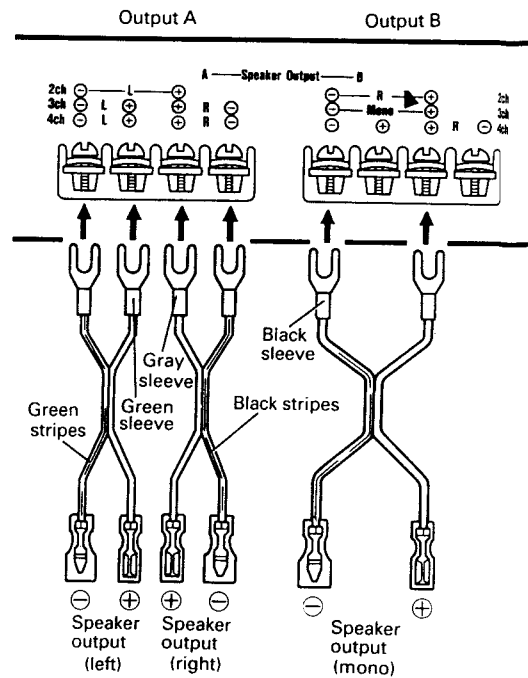


When using 3-channel mode

(Rear of amplifier)



(Front of amplifier)

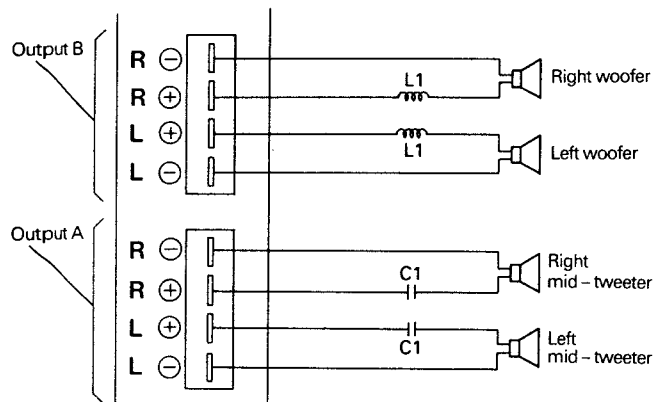


Multi Channel System with Passive Network

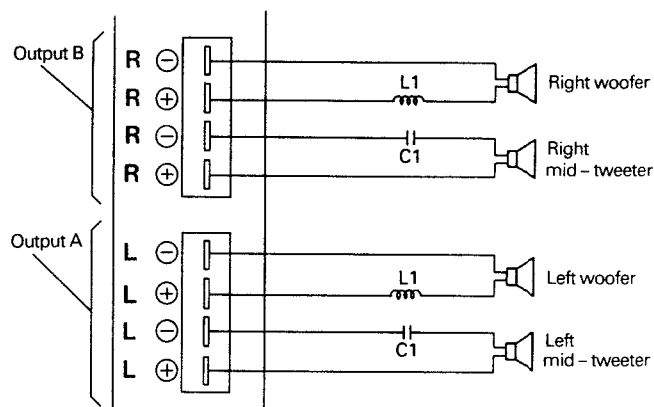
This power amplifier can be used to set up a multi channel system with additional inductors and capacitors. The connectors for 4-channel mode are shown in example 1-3.

- As making this connection does require a knowledge of electronics, get it done by your dealer or by someone specializing in such work.

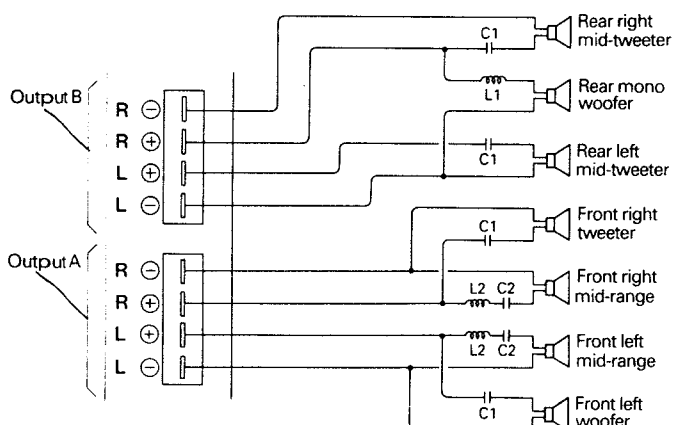
Example 1: 2-way system [4-channel mode, type 1(2 inputs)]



Example 2: 2-way system [4-channels mode, type 2(1 input)]



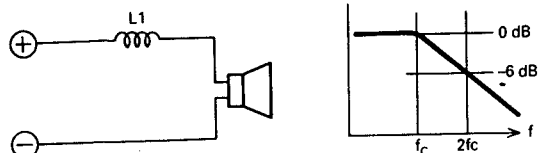
Example 3: Multi-way system [4-channel mode, type 1 (2 inputs)]



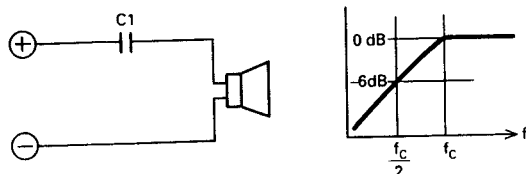
- The inductor (L1 or L2 in the diagram) acts as a low-pass filter. The capacitor (C1 or C2 in the diagram) acts as a high-pass filter. Connect the inductors (L) to the woofer, and the capacitor (C) to the mid-tweeter/tweeter unit.
- Even if the impedance of each connected speakers is 4Ω , low-pass and high-pass filters must still be used. If not, the total speaker impedance will be 2Ω or less, causing amplifier problems.
- If the inductors and capacitors are connected to the speaker leads, secure or solder them so they cannot be pulled loose. Tape the joints to prevent short circuits.

Setting the filter constant

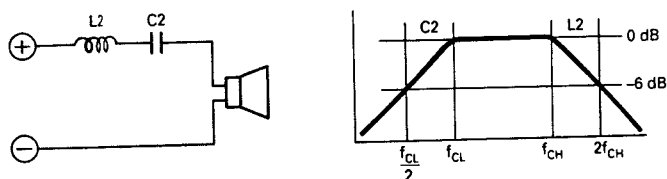
① Low-pass filter (for woofer): 6 dB/octave



② High-pass filter (for mid-tweeter/tweeter): 6 dB/octave



③ Band-pass filter (combination of low-pass filter and high-pass filter for mid): 6 dB/octave

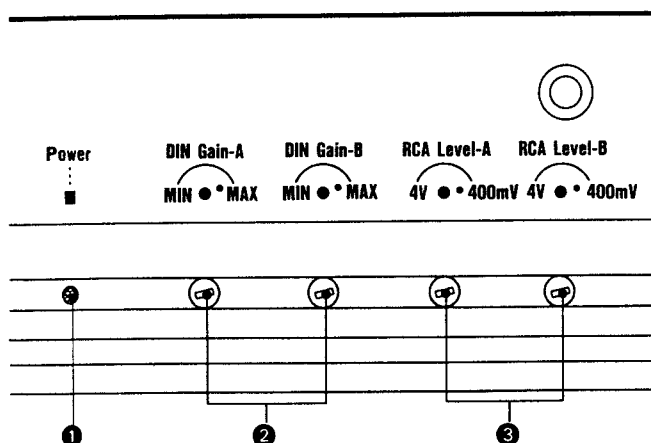
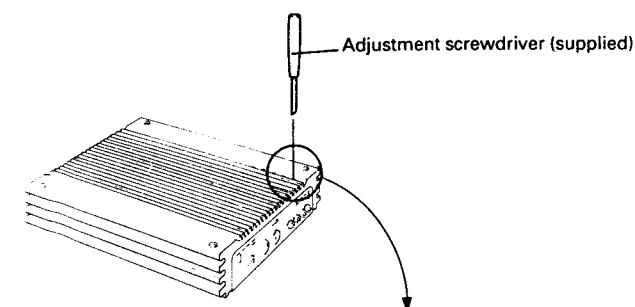


Component Guide

Speaker load impedance	2Ω		4Ω		8Ω	
	fc (Hz)	L (mH)	C (μF)	L (mH)	C (μF)	L (mH)
						C (μF)
	50	6.4	1600	12.7	800	25.5
	80	4.0	1000	8.0	500	16
	125	2.5	560	5.1	300	10
	200	1.6	400	3.2	200	6.4
	320	1.0	250	2.0	125	4
	500	0.64	160	1.3	80	2.6
	800	0.4	100	0.8	50	1.6
	1250	0.25	64	0.5	30	1.0
	2000	0.16	40	0.3	20	0.64
	3200	0.1	25	0.2	12.5	0.4
	5000	0.06	16	0.13	8	0.26
	8000	0.04	10	0.08	5	0.16
	10000	0.03	8	0.06	4	0.13

- A multi-channel system can be set up using a combination of filters ①, ②, and ③. The inductance (L) and capacitance (C) that determine the frequency (fc) applicable to the system should be chosen according to the above table.
- Use the capacitors specified. Non-polarized capacitors rated at over ±25V should be used for C1 and C2 in the diagram.

4. CONTROLS AND THEIR USE (EW MODEL)



① Power indicator

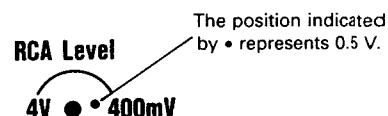
The power indicator lights when the power is switched on.

② DIN input gain controls A and B

If the amplifier is connected to a Pioneer car component with a DIN socket, DIN input gain controls A and B need to be adjusted. Normally, set the controls to the indicated positions •. Gain control A adjusts speaker output A, gain control B adjusts speaker output B.

③ RCA input level controls A and B

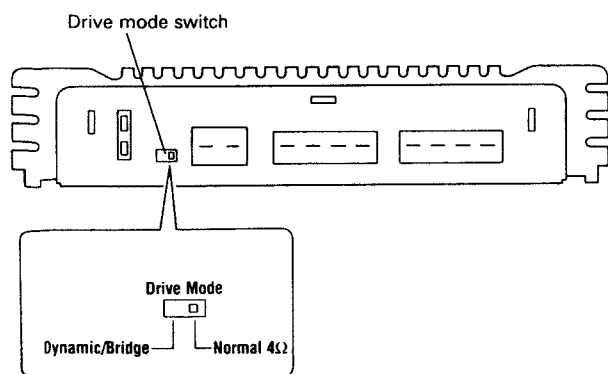
If the amplifier is connected to a car component with RCA pin jacks, RCA input level controls A and B need to be adjusted. If the component is a Pioneer, set the controls to the indicated positions •. Level control A adjusts speaker output A; level control B adjusts speaker output B.



- Adjust controls ② and ③ with the supplied adjustment screwdriver. Keep the screwdriver in case you need to readjust the controls later.

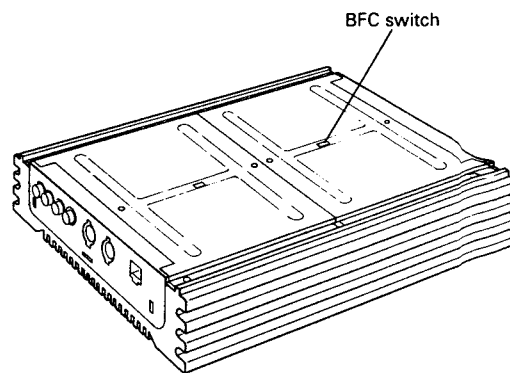
Drive mode switch

If the impedance of the speakers connected to the amplifier in 4-channel mode is 4Ω or more, slide the drive mode switch on the front to the right (Normal 4Ω). If 2- or 3-channel mode is used or if the speaker impedance is less than 4Ω , slide the switch to the left (Dynamic/Bridge).



BFC (Beat Frequency Control) switch

If beating is heard when listening to AM stations on your car radio, change the position of the BFC switch on the bottom of the amplifier with a small flat-bladed screwdriver.



5. CONNECTING THE UNITS (EW MODEL)

Connect the components as shown in the diagram.

- Before finalizing installation, turn everything on, and make sure everything works correctly and that no noise is getting into the system.
- When routing leads and cords, secure them with cable retainers and electrician's adhesive tape. Also, to prevent any damage to the insulation on the leads and cords, protect them with electrician's adhesive tape wherever they may touch sharp edges.
- Keep all wiring away from hot surfaces or heater outlets to prevent short circuits.
- It is recommended that the speakers connected to the amplifier have the ratings shown below, or higher. If a speaker has a rating below that recommended, it may be damaged when the volume is turned up. The speaker impedance must be 2 to 8 ohms.

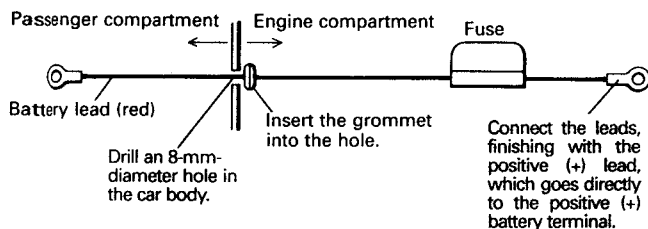
Mode	Speaker ratings
4-channel	Maximum: 80 W Nominal: 40 W
2-channel	Maximum: 180 W Nominal: 90 W
3-channel Speaker output (A)	Maximum: 60 W Nominal: 30 W
Speaker output (B)	Maximum: 180 W Nominal: 90 W

In the case of a full-range speaker, use one whose maximum rating is higher than the maximum rating shown. In the case of a sub-woofer, use one whose nominal rating is higher than the nominal rating shown. If a sub-woofer is used, connect the separately-sold crossover network to the amplifier.

- Never connect a speaker lead to ground or to other speaker grounds. The protection circuitry will operate instantaneously, turning off the amplifier.
- To prevent noise problems, keep the power leads to the amplifier away from the signal cords and speaker leads. Also, keep the power leads away from any antenna cords.
- Amplifier ground leads (black) should be connected to a solid metal part of the vehicle body. If using multiple amplifiers, connect all amplifier ground leads to the same point to prevent noise problems. To get good contact when grounding, you may have to sand away the paint to expose the metal underneath.
- To operate the amplifier and car stereo properly, connect the battery lead and the accessory power lead (red/black) correctly. If the leads are not connected correctly or are not connected at all, the amplifier and car stereo will not work.
- To connect the amplifier to the RCA pin jacks of a car stereo component, use an audio cord with RCA pin plugs. To connect the amplifier to the DIN socket of a car stereo component, use a DIN connection cord. Both kinds of cord are available from your dealer.

Connecting the battery lead (red)

Route the battery lead (red) from the engine compartment to the passenger compartment to connect it to the amplifier. To prevent a short circuit, do not connect the positive (+) lead of the battery until the other leads have been connected.



Connection of speaker leads and input leads

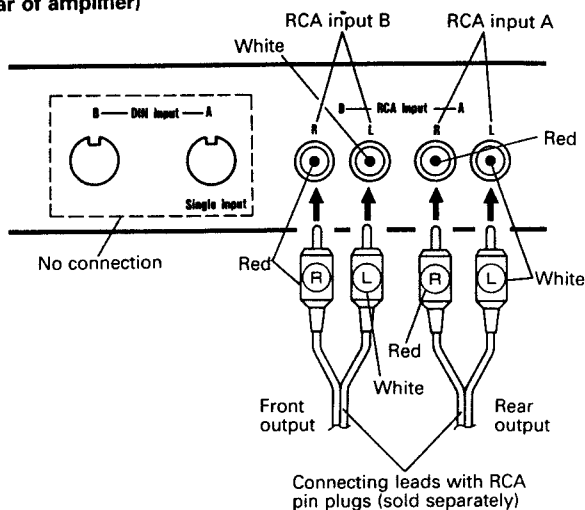
Either 4-channel mode (2 inputs/4 speakers or 1 input/4 speakers), 2-channel mode (1 input/2 speakers), or 3-channel mode (2 inputs/3 speakers) can be selected for the speaker output. The way the speaker leads and RCA or DIN input cords are connected depends on the mode used.

Mode	Input/output	RCA pin jacks are used ⁽¹⁾	DIN socket is used ⁽²⁾
4-channel mode, type 1	• Inputs A and B (2 inputs) • 4-speaker (front/rear) output	Page 11	Page 13
4-channel mode, type 2	• Input A (1 input) • 4-speaker (2 stereo pairs) output	Page 11	Page 13
2-channel mode	• Input A (1 input) • 2-speaker output	Page 12	Page 14
3-channel mode	• Inputs A and B (2 inputs) • 2-speaker (stereo) plus 1 speaker (mono) output	Page 12	Page 14

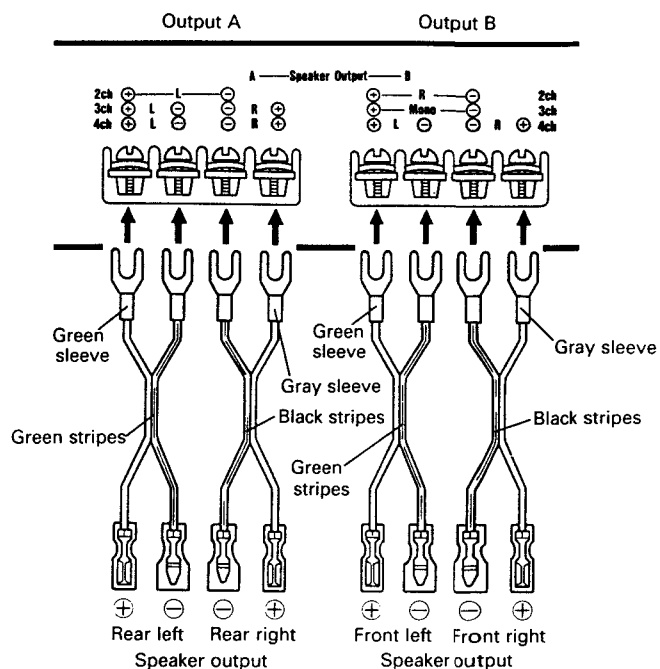
Connection of speaker and RCA input leads when the amplifier is connected to a car component with RCA pin jacks

When using 4-channel mode type 1

(Rear of amplifier)



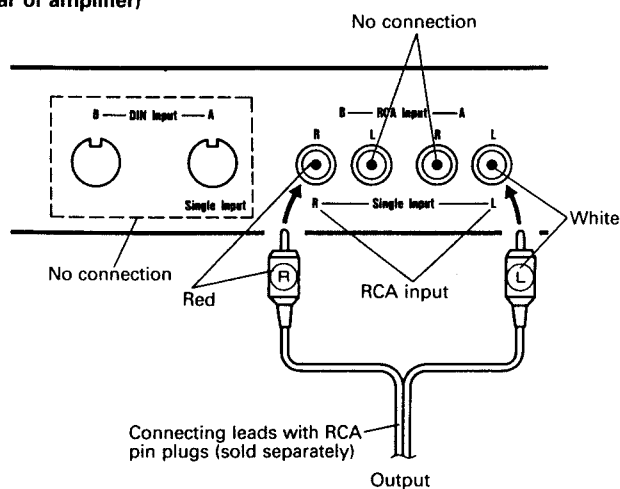
(Front of amplifier)



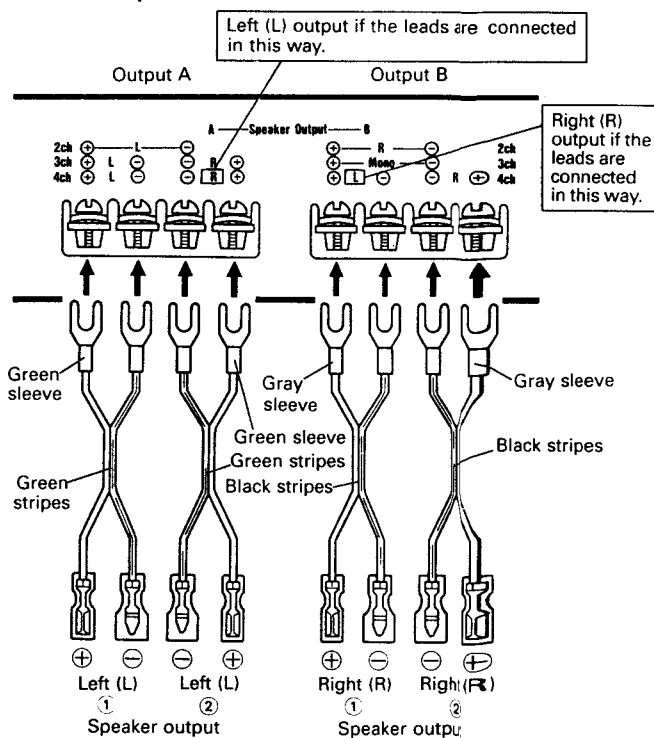
When using 4-channel mode type 2

- With this connection, the left (L) and right (R) positions of the speaker terminals on the front of the amplifier are slightly different from the positions indicated.
- The left (L) ① and right (R) ① speaker leads to stereo output ① and the left (L) ② and right (R) ② speaker leads to stereo output ② (two pairs of stereo outputs).
- Connect the RCA outputs of the car component to the RCA inputs marked Single Input on the rear of the amplifier.
- If the RCA input levels are adjusted, set input level controls A and B to the same position.

(Rear of amplifier)



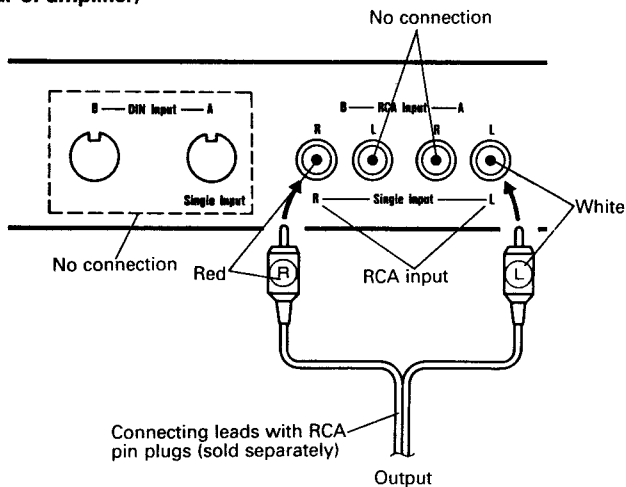
(Front of amplifier)



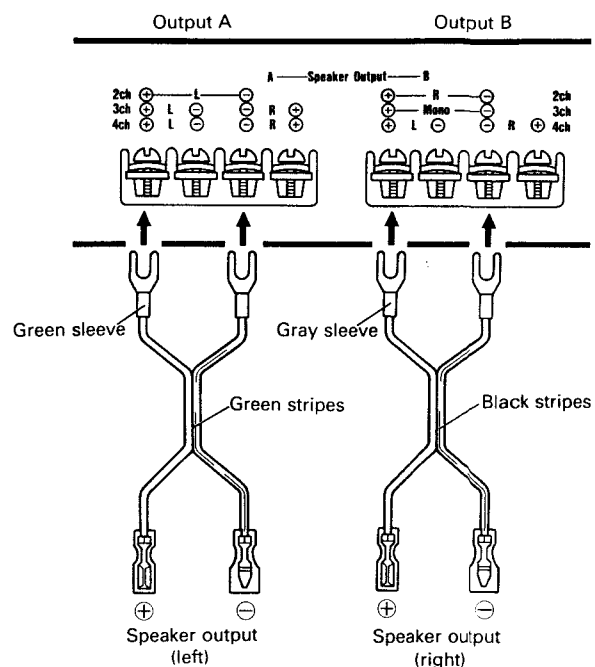
When using 2-channel mode

- Connect the RCA outputs of the car component to the RCA inputs marked Single Input on the rear of the amplifier.
- Slide the drive mode switch to the left (Dynamic/Bridge).
- If the RCA input levels are adjusted, set input level controls A and B to the same position.

(Rear of amplifier)



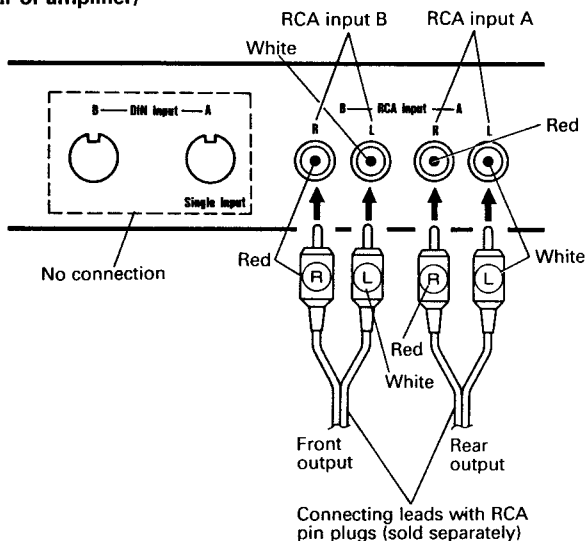
(Front of amplifier)



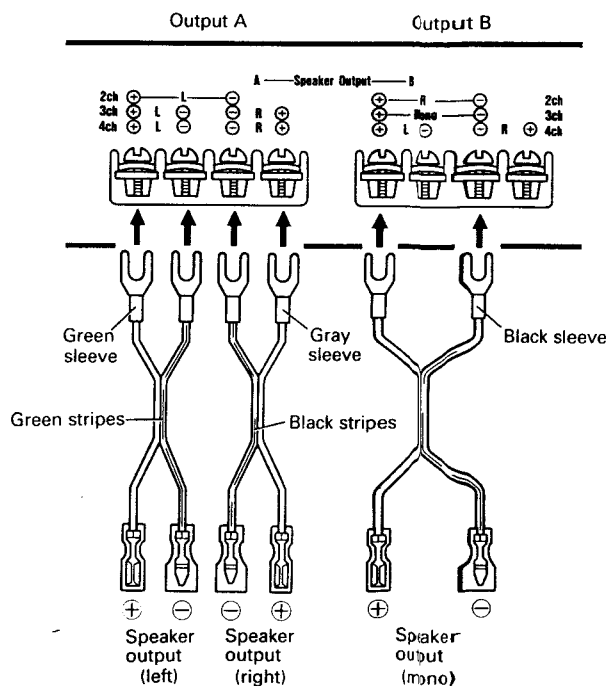
When using 3-channel mode

- Slide the drive mode switch to the left (Dynamic/Bridge).

(Rear of amplifier)



(Front of amplifier)

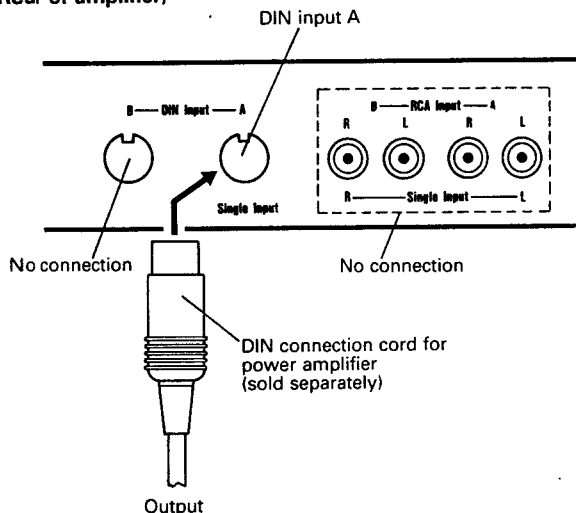




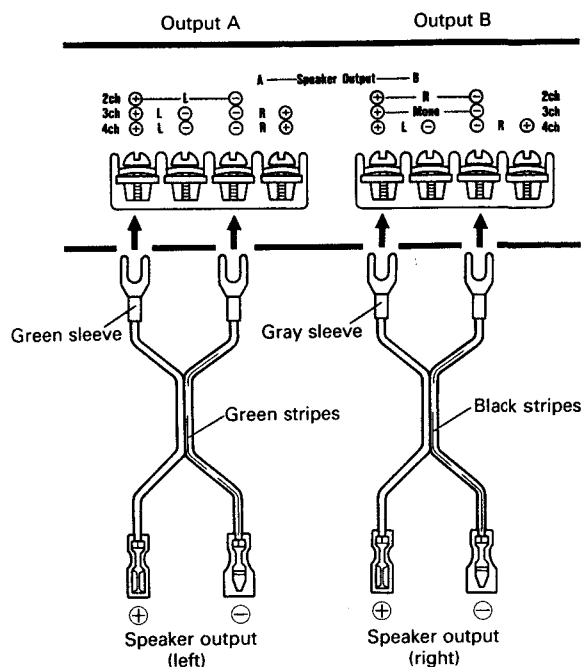
When using 2-channel mode

- Connect the DIN output of the car component to DIN input A on the rear of the amplifier.
- Slide the drive mode switch to the left (Dynamic/Bridge).
- If the DIN input gains are adjusted, set DIN input gain controls A and B to the same position.

(Rear of amplifier)



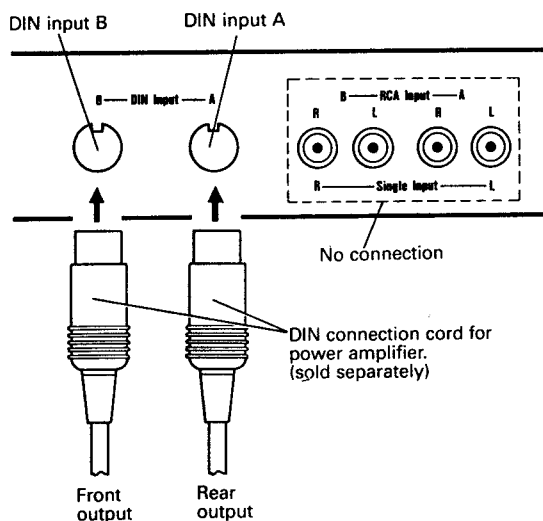
(Front of amplifier)



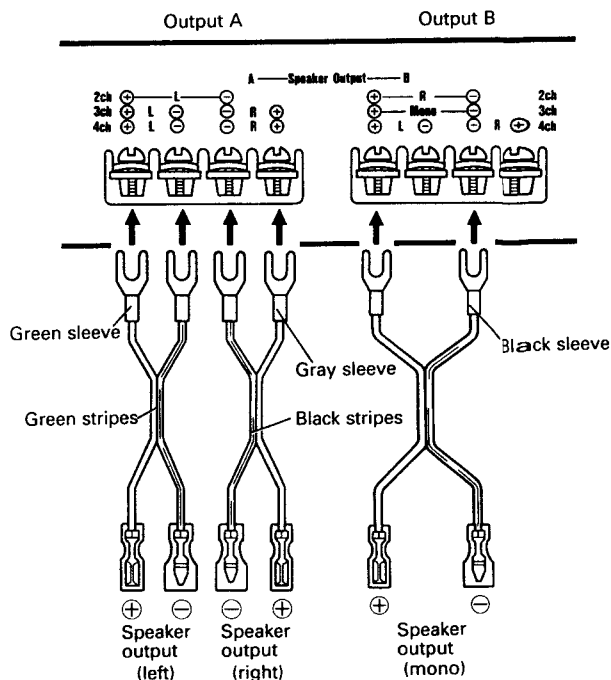
When using 3-channel mode

- Connect the rear DIN output of the car component to DIN input A on the rear of the amplifier. The amplifier does not work if the front DIN output of the car component is connected to DIN input A.
- Connect the front DIN output of the car component to DIN input B on the rear of the amplifier (mono output).
- Slide the drive mode switch to the left (Dynamic/Bridge).

(Rear of amplifier)

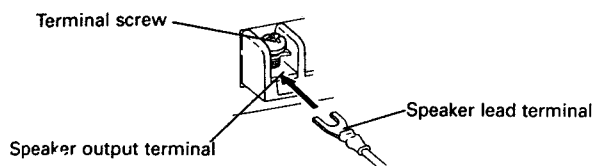


(Front of amplifier)

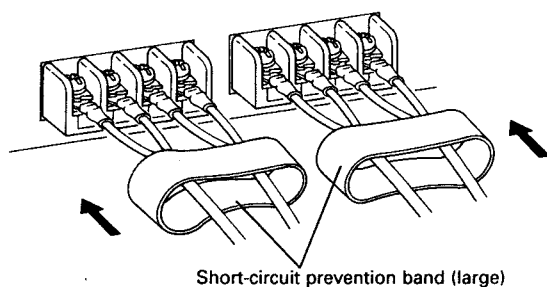


Speaker lead connection procedure

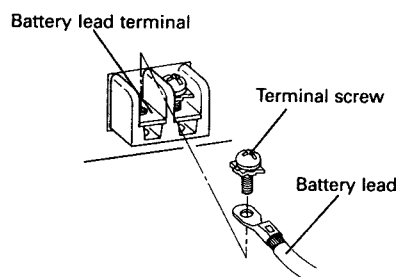
1. Loosen the eight screws of the speaker terminals (Speaker Outputs A and B) on the front of the amplifier.
2. Insert the end of each speaker lead between the speaker terminal and its screw according to the mode to be used, and tighten the screw.



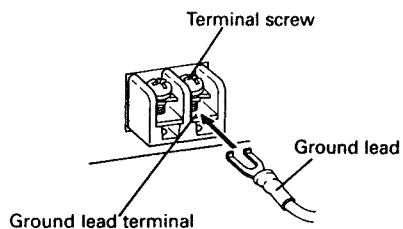
3. Cover each terminal block with a short-circuit prevention band (large).
 - This band *must* be used.



3. Connect the battery lead to the battery lead terminal, reinserting and tightening the screw.

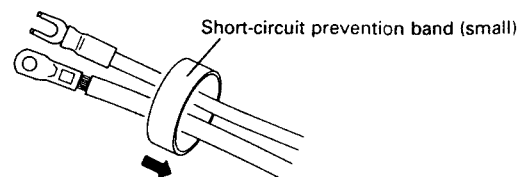


4. Connect the ground lead to the ground lead terminal, tightening the screw.

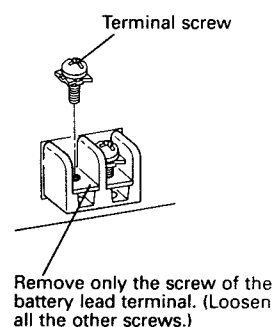


Connection of the battery power and ground leads

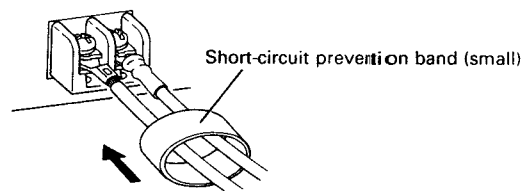
1. Pass the battery power and ground leads through a short-circuit prevention band (small).
 - This band *must* be used.



2. Loosen the screws of the terminals on the front of the amplifier.
 - Remove the screw from the battery power terminal.

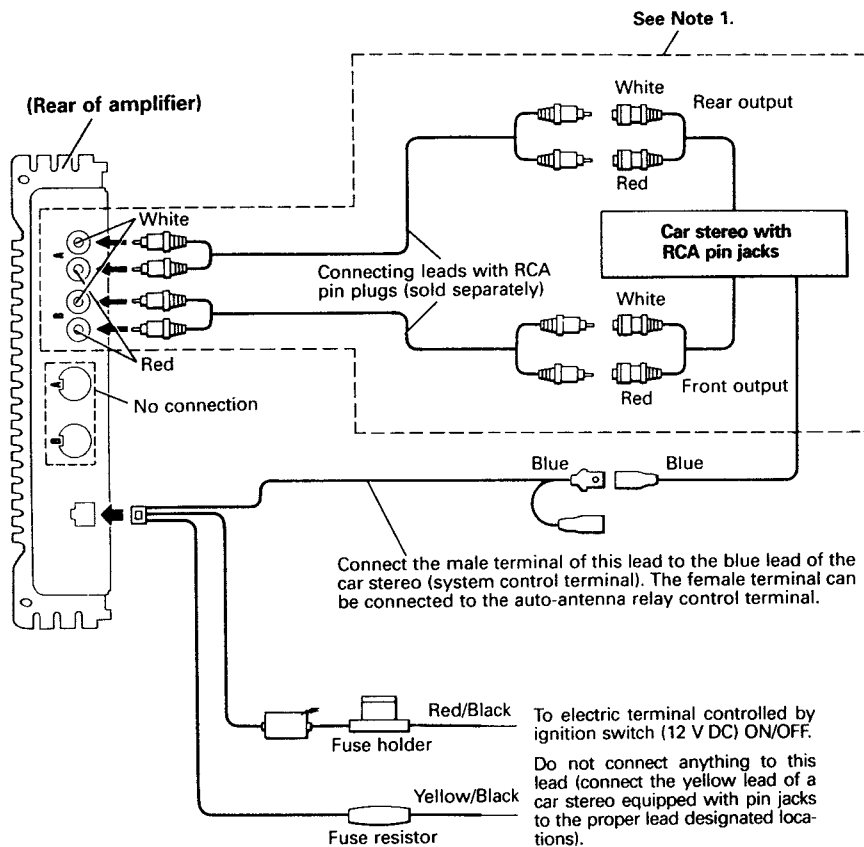
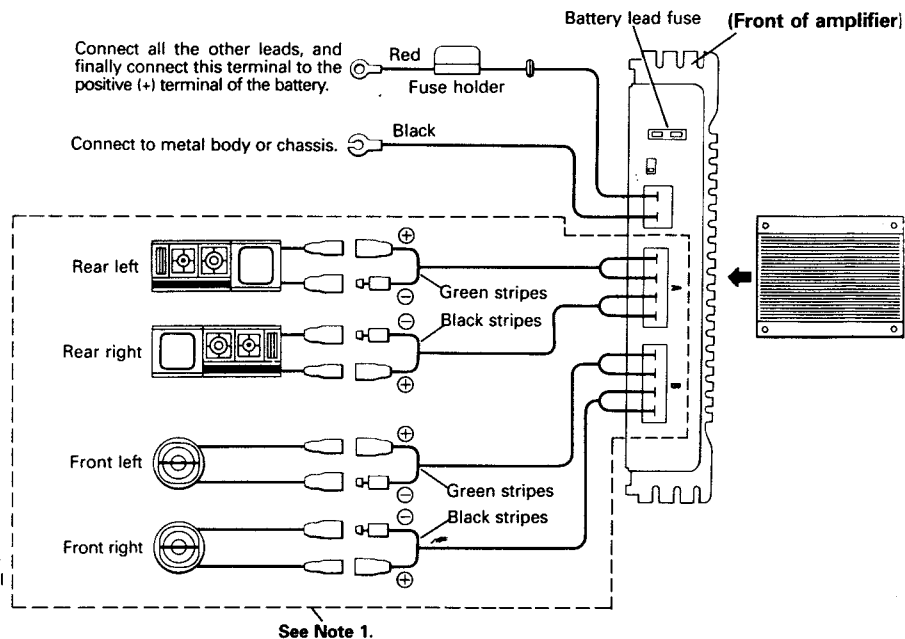


5. Cover the terminals with a short-circuit prevention band (small).

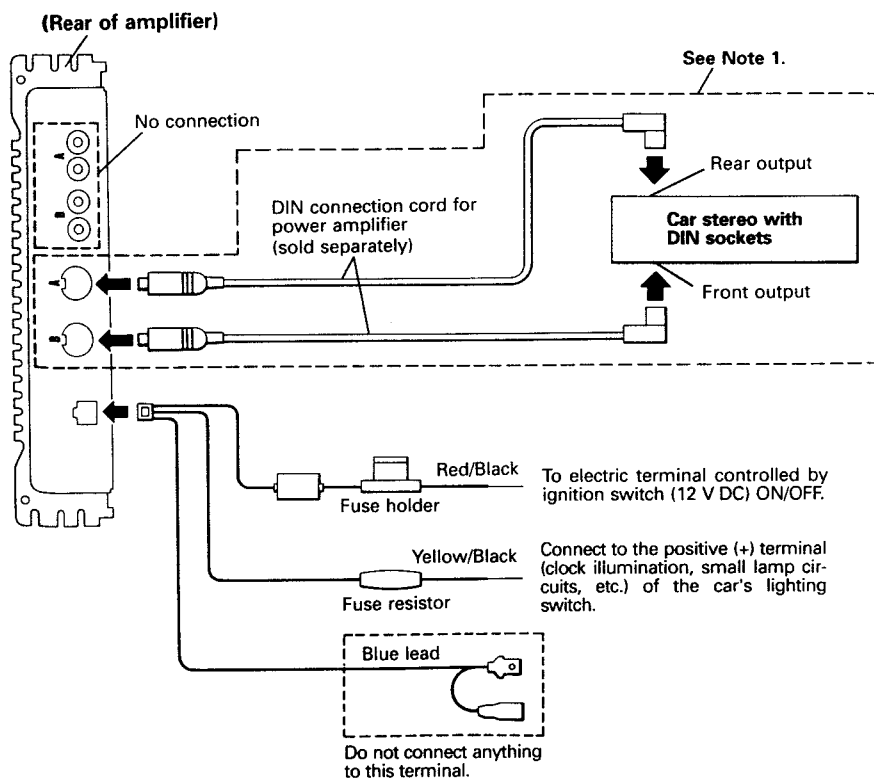
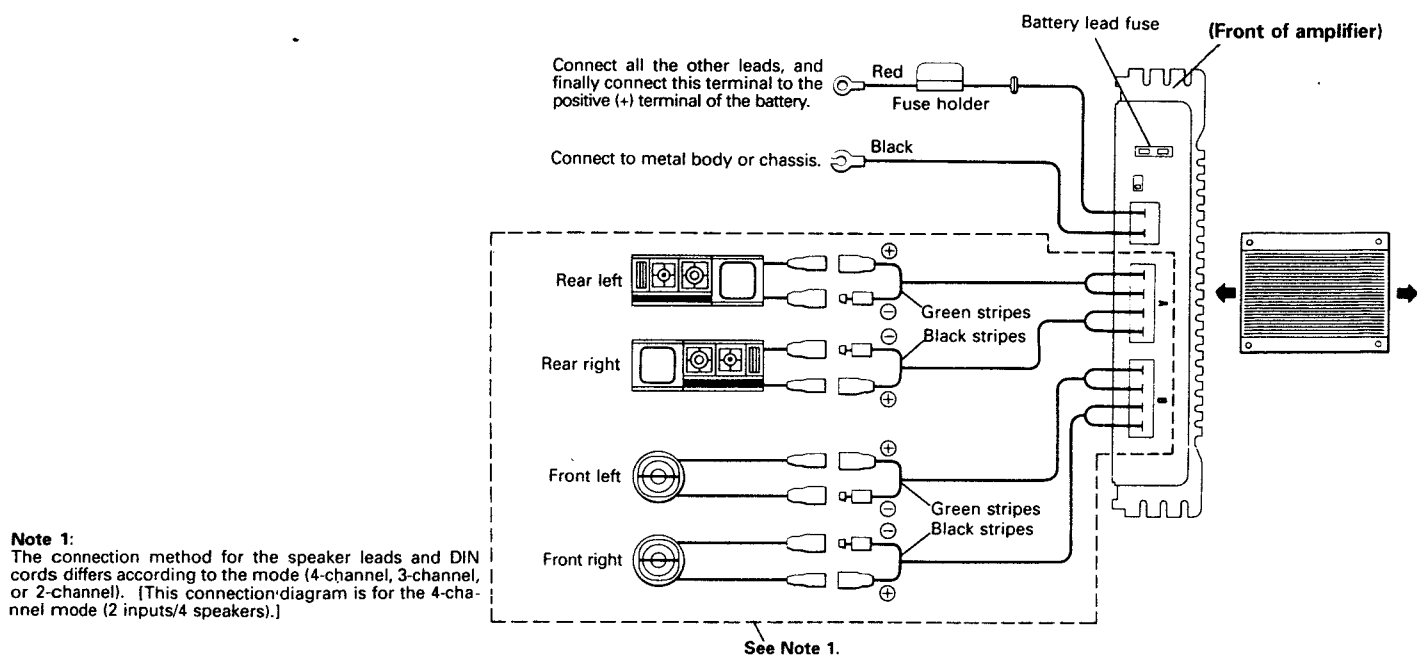


When Combined with a Car Stereo with RCA Pin Jacks

Note 1:
The connection method for the speaker and RCA leads differs according to the mode (4-channel, 3-channel, or 2-channel). [This connection diagram is for the 4-channel mode (2 inputs/4 speakers).]



When Combined with a Car Stereo with DIN Sockets



6. DISASSEMBLY

● Remove the Case

1. Remove the four screws A and remove the two cases.

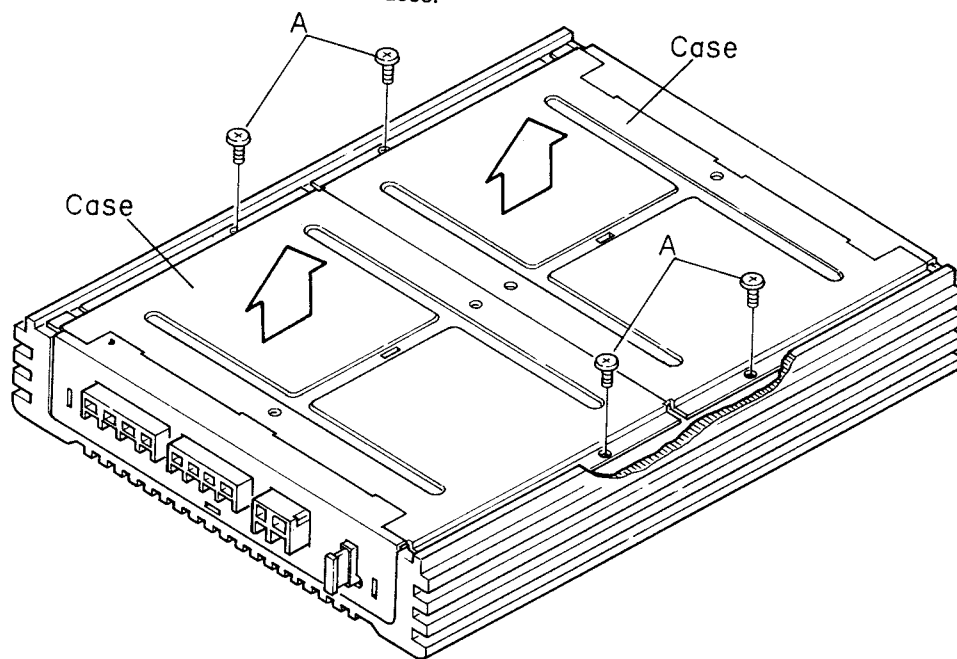


Fig. 1

● Remove the Amp Assy

1. Remove the two screws B and remove the front panel.
2. Remove the two screws C and remove the rear panel.
3. Remove the four screws D and eleven screws E.
4. Remove the Amp Assy.

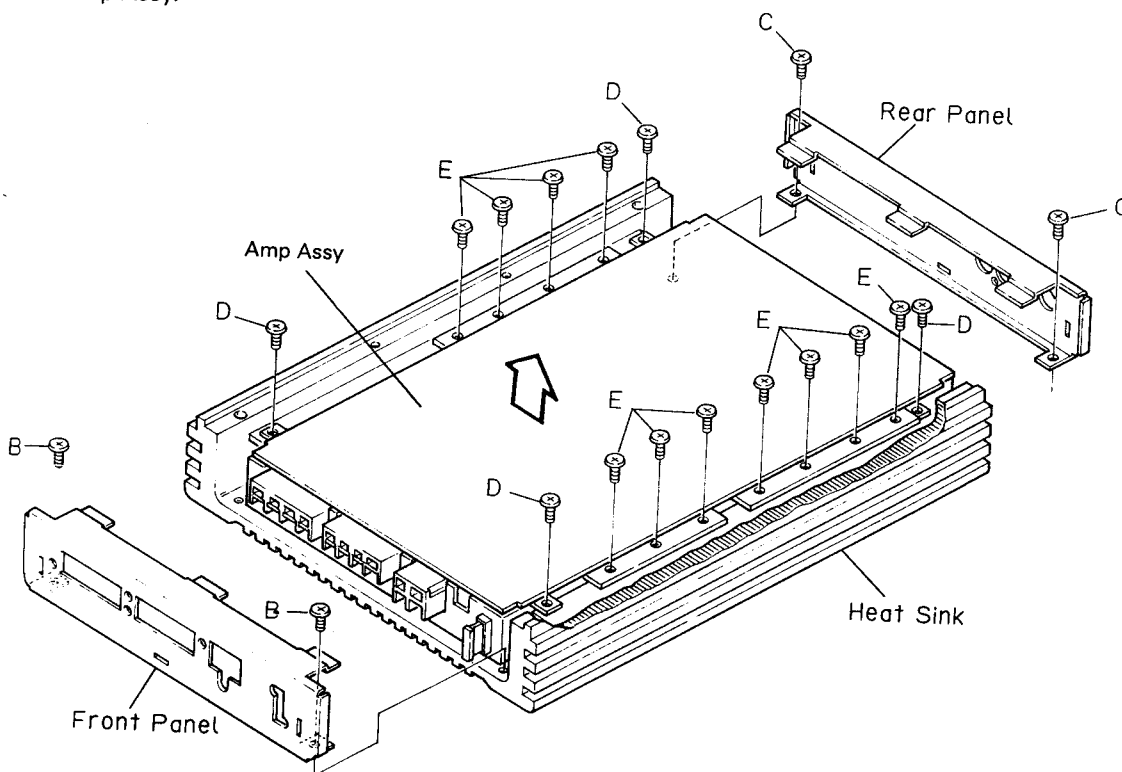


Fig.2

7. CIRCUIT DESCRIPTION

• PWM (Pulse Width Modulation) POWER SUPPLY

The PWM power supply is a circuit that maintains stable secondary voltage in a DC-DC converter, regardless of the voltage fluctuation and load fluctuation of the primary voltage.

Former PWM power supply detected and controlled only positive voltage of DC-DC converter. New PWM power supply increases output in the lower range through detecting and controlling both positive and negative voltages and it creates a higher fidelity sound.

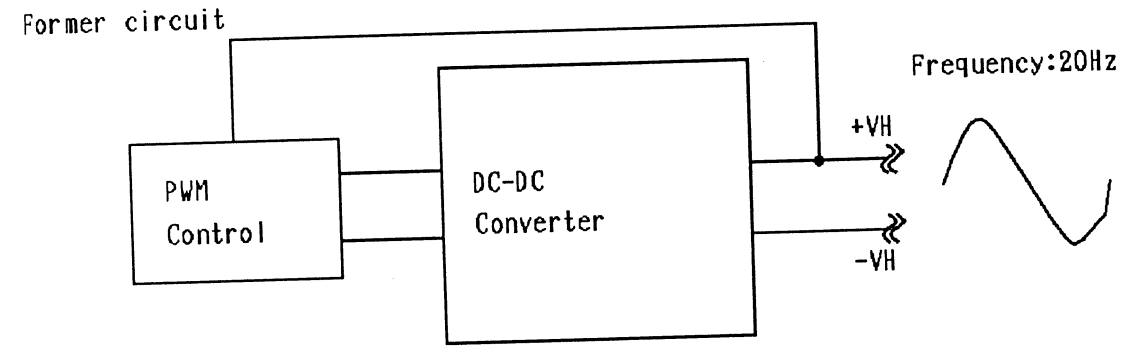


Fig. 3

Former circuit did not detect negative voltage and it created distortions at the lower part as output increases.

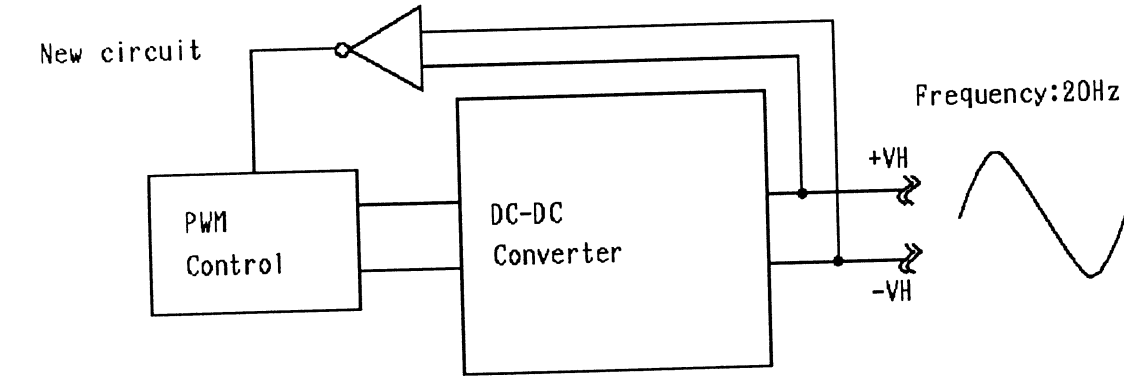


Fig. 4

New circuit detects both positive and negative voltage and it does not create any distortions at the lower part even when output increases.

8. ADJUSTMENT

• Connection Diagram

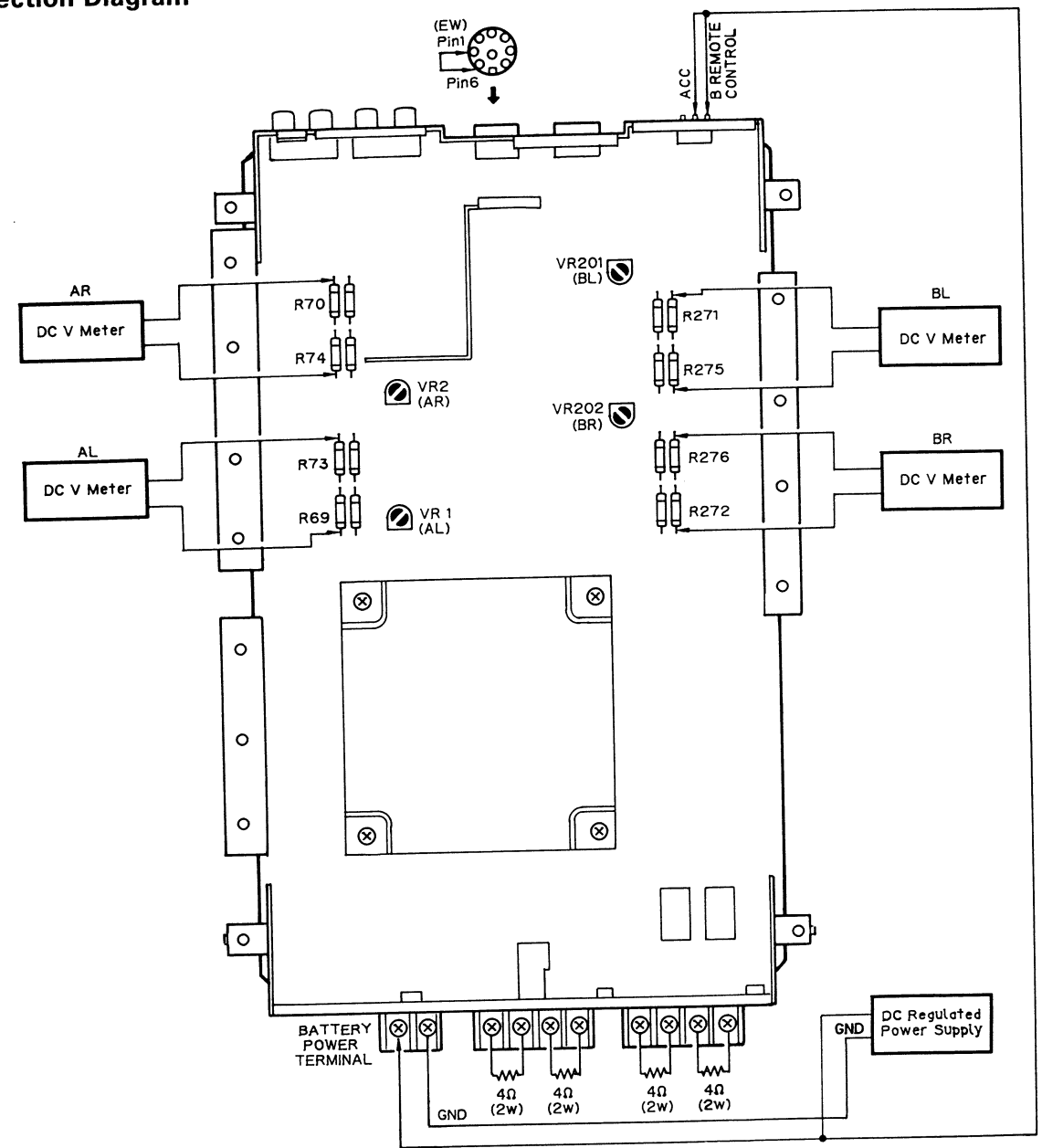


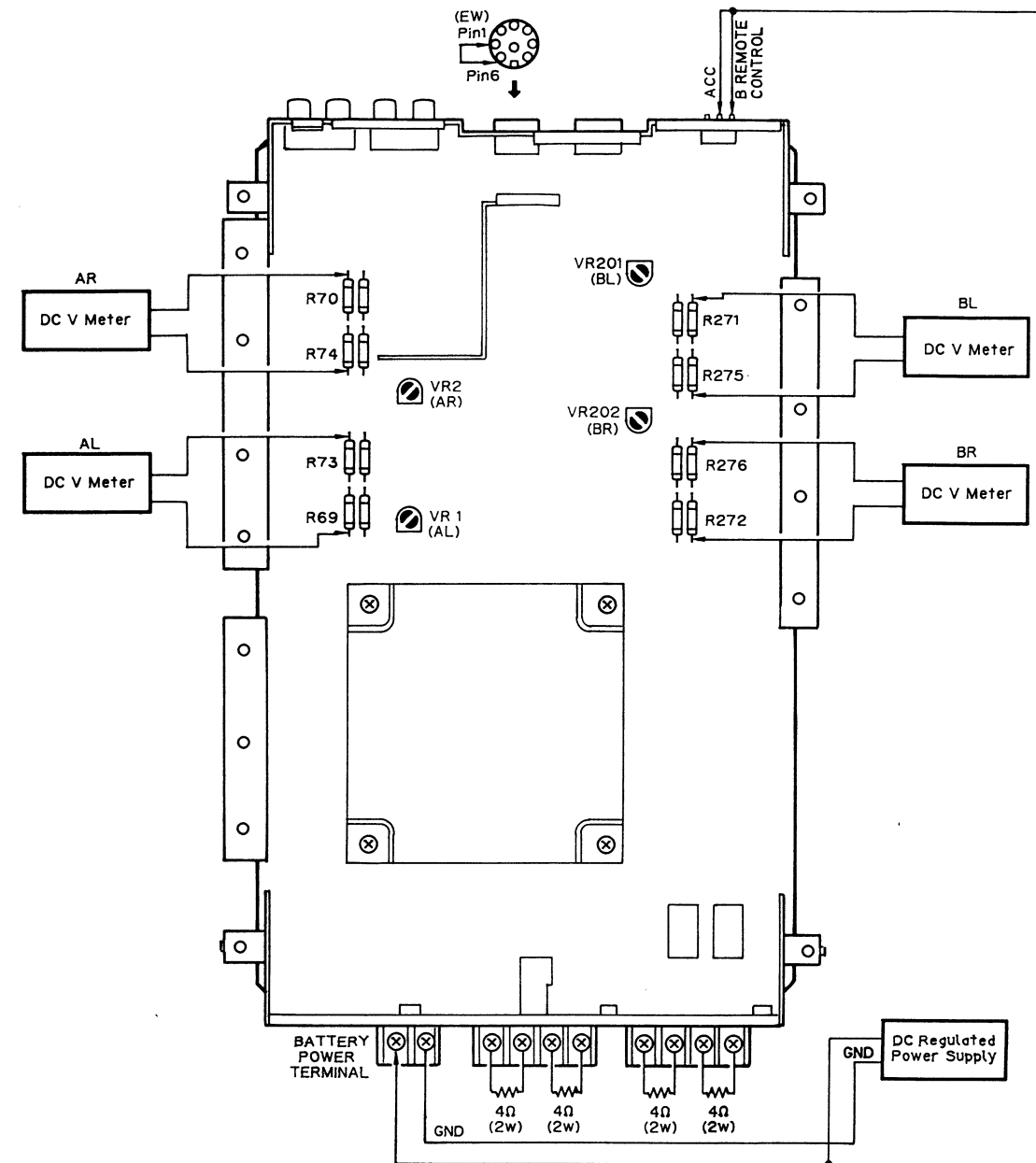
Fig. 5

8.1 IDLE CURRENT ADJUSTMENT

No.	Adjusting Point	Adjustment Method (Switch Position)
1		Rotate VR1, VR2, VR201 and VR202 counterclockwise. Turn the power on, and wait about 10 minutes.
2	VR1 (AL) VR2 (AR) VR201 (BL) VR202 (BR)	DC V Meter: 1.0mV + 2.3mV - 0.34mV (DRIVE MODE SELECT SWITCH : 4Ω GM-3400/EW)

8. ADJUSTMENT

• Connection Diagram

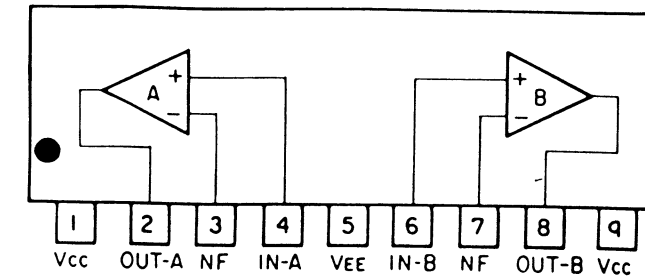


8.1 IDLE CURRENT ADJUSTMENT

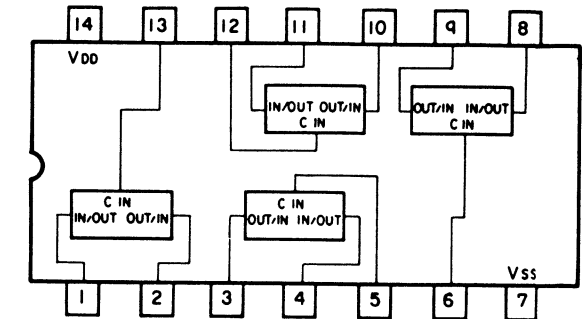
No.	Adjusting Point	Adjustment Method (Switch Position)
1		Rotate VR1, VR2, VR201 and VR202 counterclockwise. Turn the power on, and wait about 10 minutes.
2	VR1 (AL) VR2 (AR) VR201 (BL) VR202 (BR)	DC V Meter: $1.0\text{mV} + 2.3\text{mV}$ $- 0.34\text{mV}$ (DRIVE MODE SELECT SWITCH : 4Ω GM-3400/EW)

• ICs

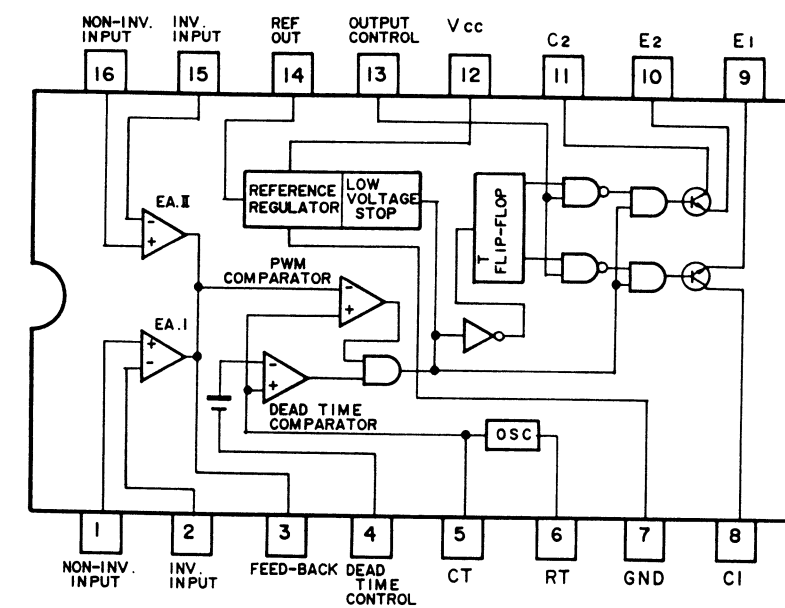
UPC4570HA



TC4066BP



UPC494C



TA8194Z

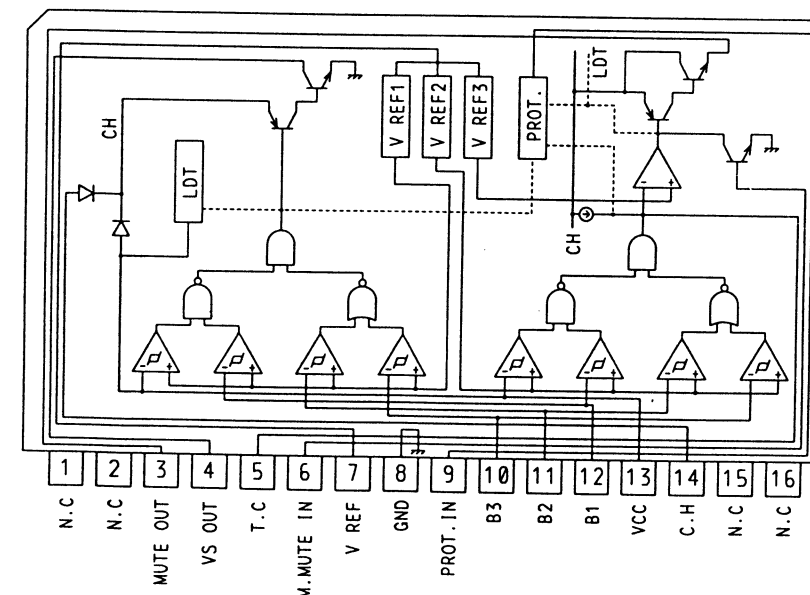
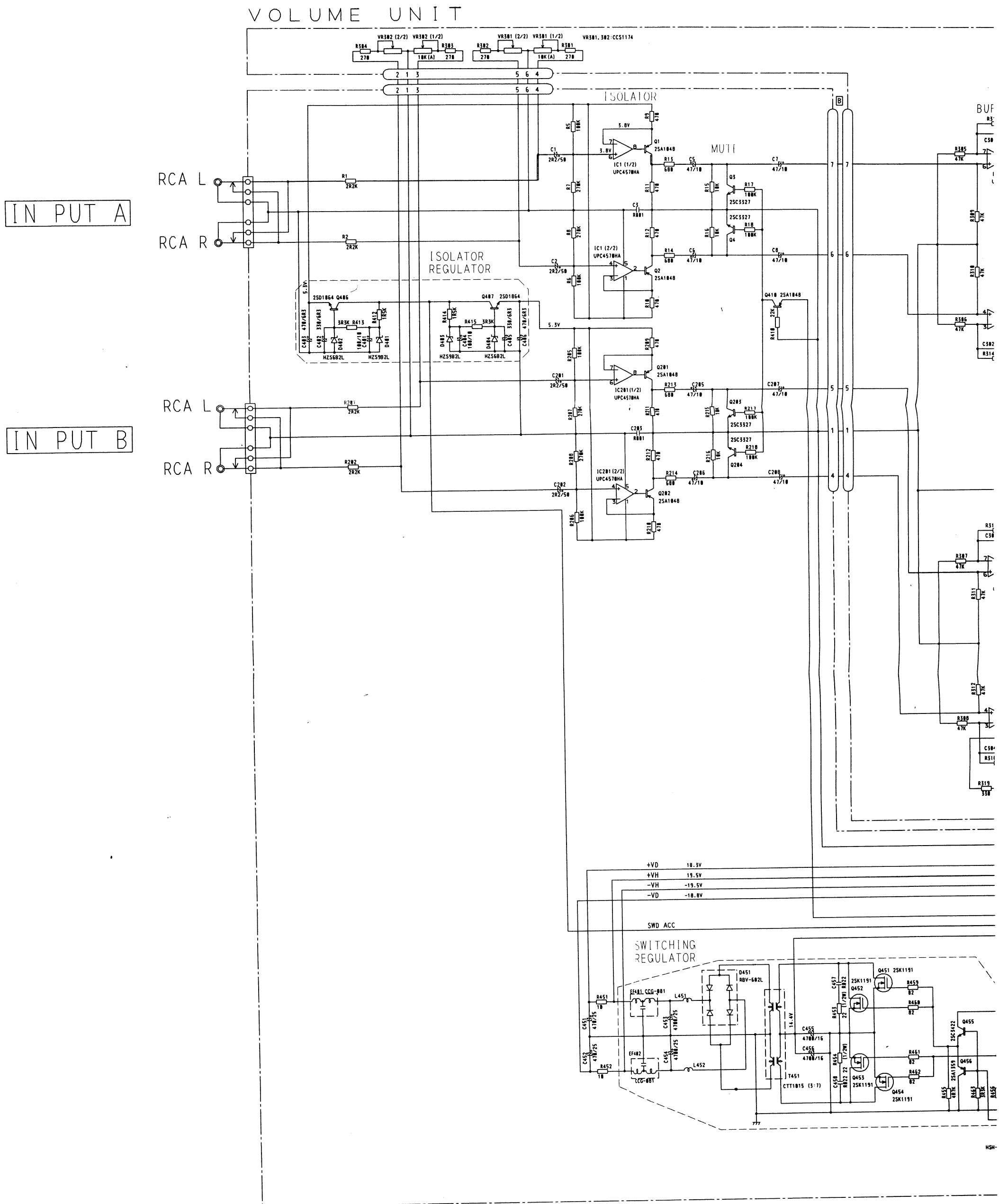


Fig. 5

The diagram shows three speaker configurations: 4ch, 2ch, and 3c. The 4ch configuration has four speakers (AL+, AL-, AR+, AR-). The 2ch configuration has two speakers (AL+, AR+). The 3c configuration has three speakers (BL+, BR+, and a center channel speaker). The diagram also shows the connection of the 6000 series to a 30A battery power terminal and a GND terminal.

Fig.

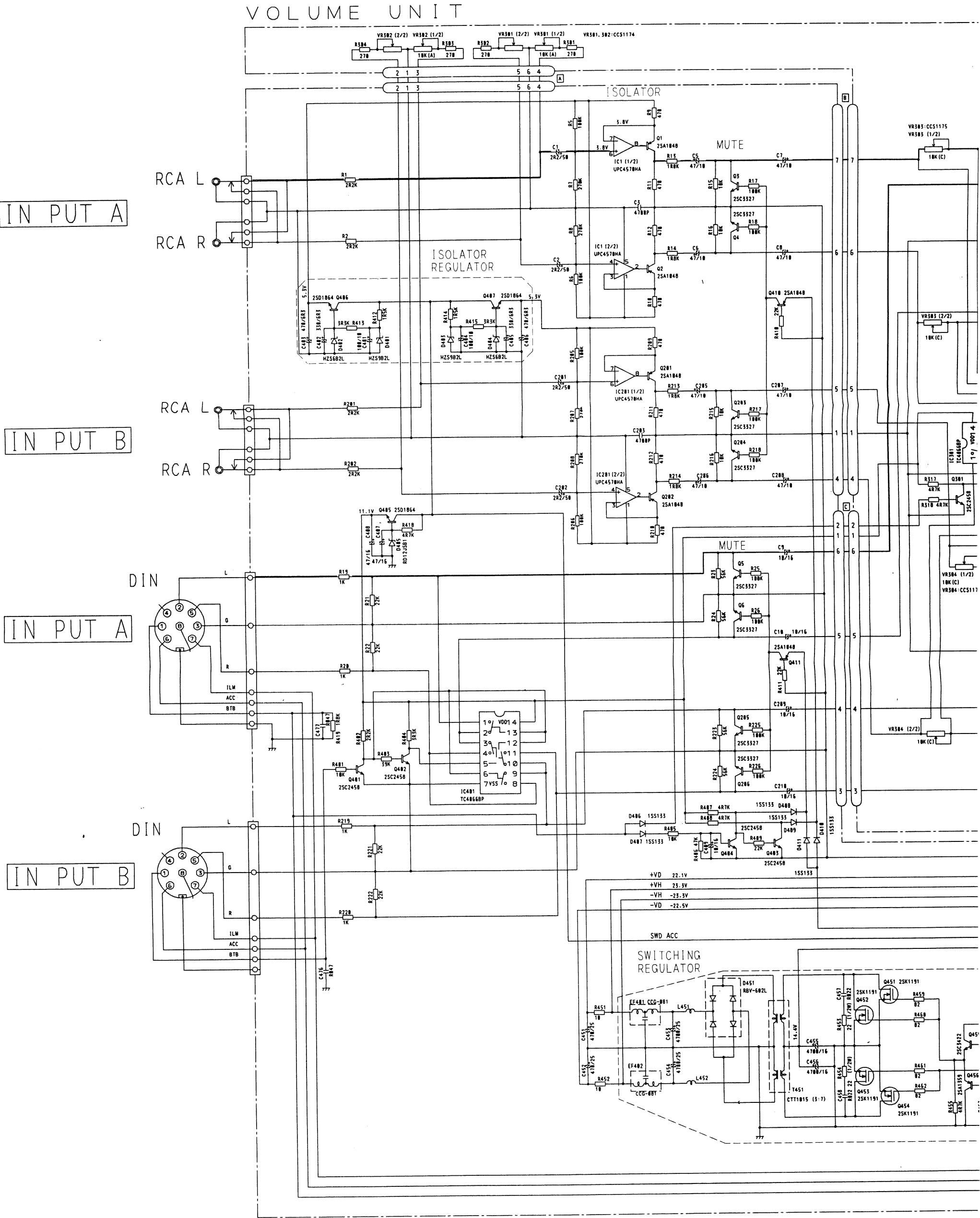
10. SCHEMATIC CIRCUIT DIAGRAM (GM-H120/UC)



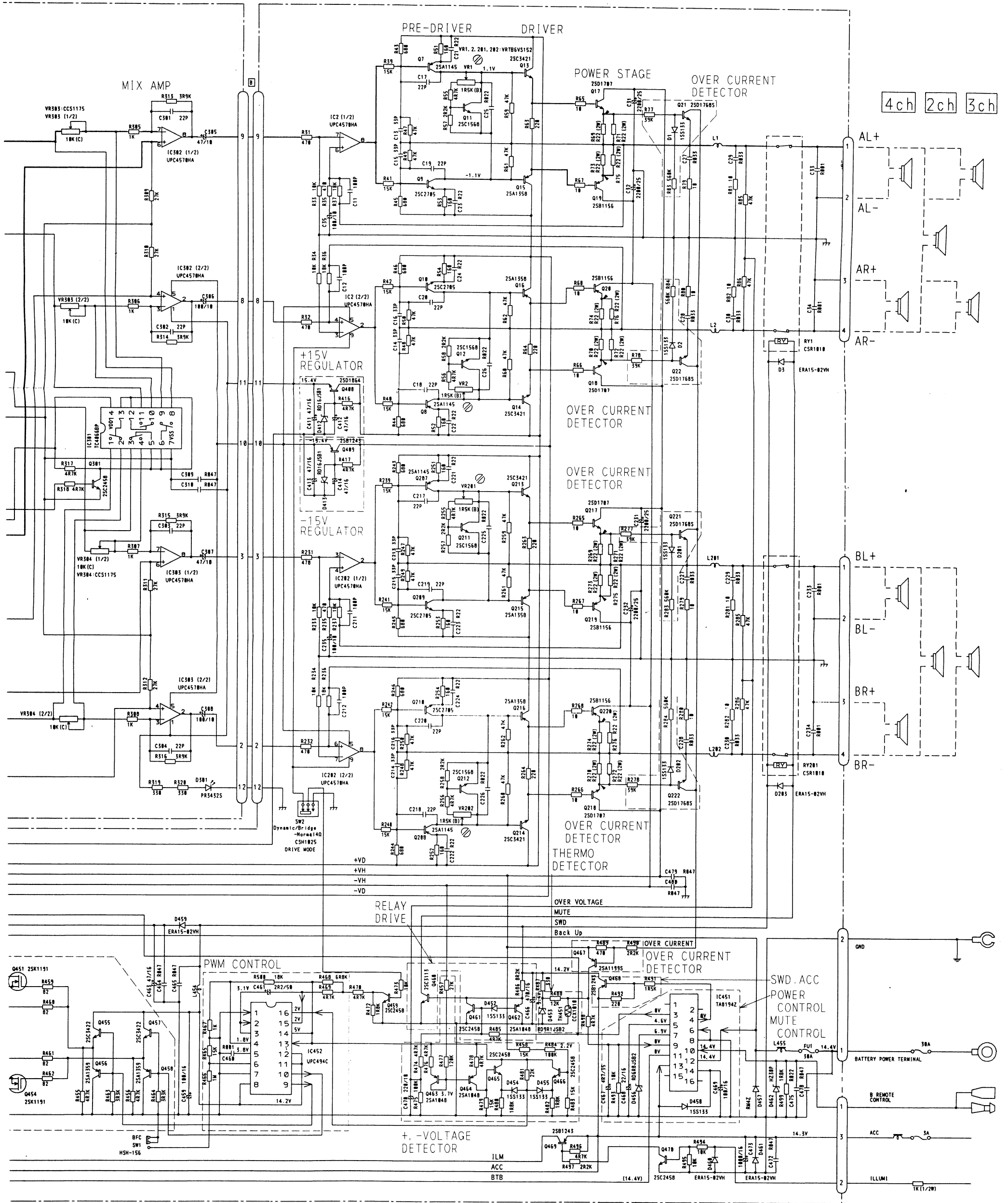
NOTE :

-  Symbol indicates a resistor.
No differentiation is made between discrete resistors.
-  Symbol indicates a capacitor.
No differentiation is made between discrete capacitors.

11. SCHEMATIC CIRCUIT DIAGRAM (GM-3400/EW)



AMP UNIT



indicates a resistor.
entiation is made between chip resistors and resistors.

indicates a capacitor.
entiation is made between chip capacitors and capacitors.

Decimal points for resistor and capacitor fixed values are expressed as 2.2-2R2 0.022-R022

SWITCHES:
AMP UNIT
SW1: BFC SWITCH LOW-HIGH
SW2: DRIVE MODE SWITCH Dynamic/Bridge-Normal 14Ω
The underlined indicates the switch position.



13. EXPLODED VIEW

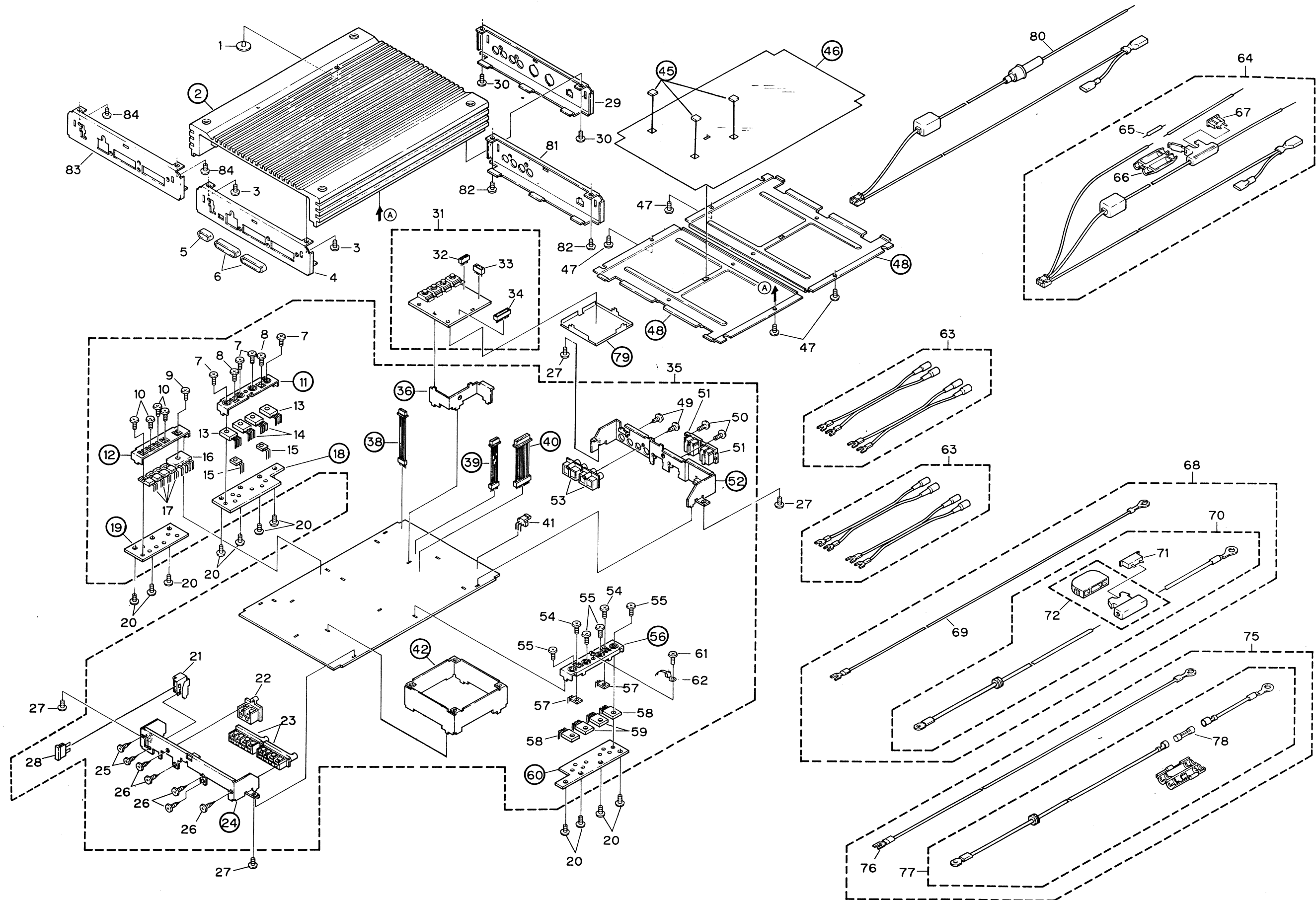


Fig. 10

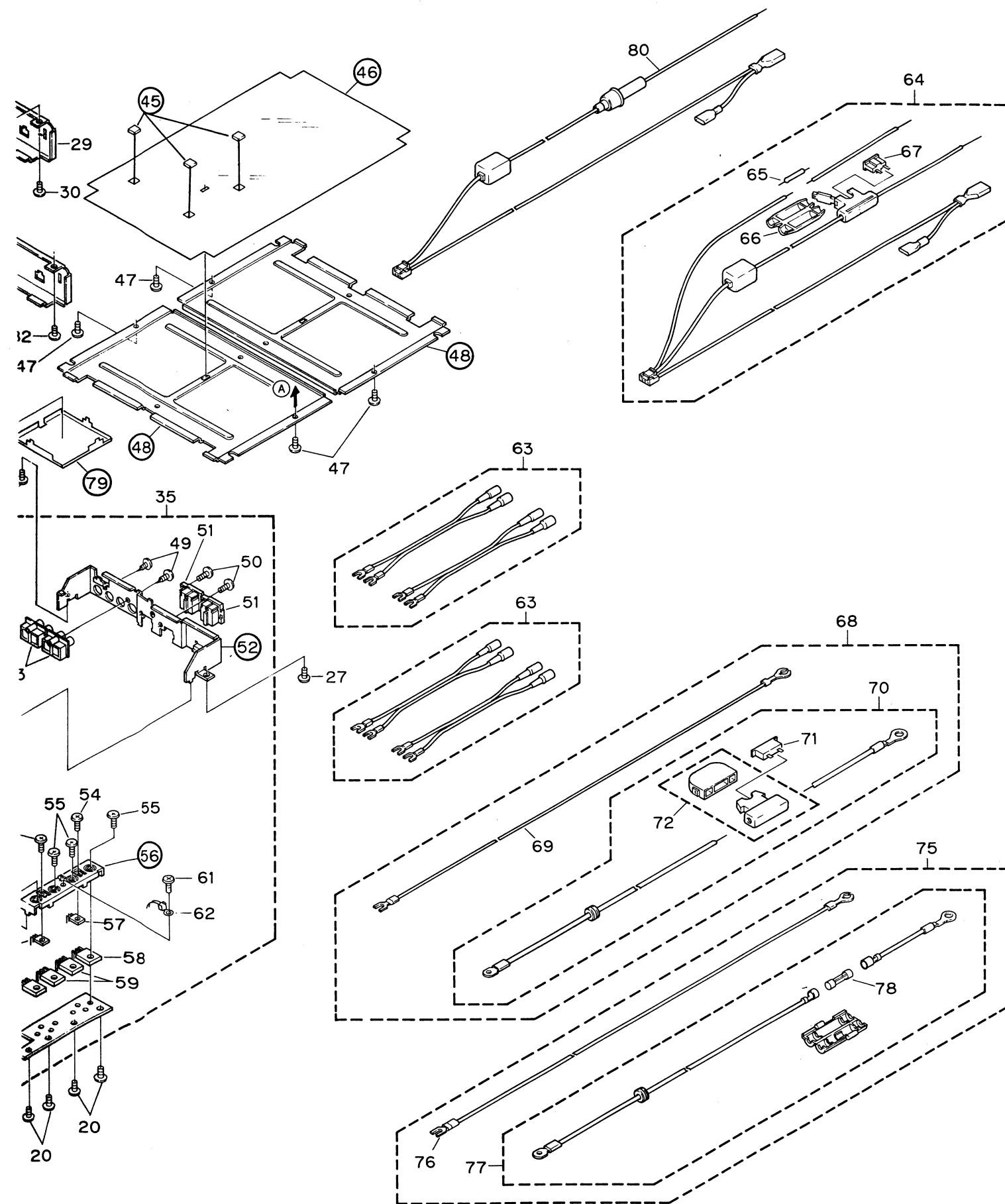


Fig. 10

● Parts List

NOTE:

- The parts marked with "●" may need long time to supply and their supply is subject to refuse as the case may be.
- Because the parts with encircled number shown on the dismantling drawing are not spare parts, we are unable to supply them in principle.

A

B

C

D

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Lens	CNS2053	43		
2	Heat Sink (UC)	CNR1195	44		
	Heat Sink (EW)	CNR1211	45	Spacer	CNM3075
3	Screw (EW)	BBZ30P050FMC	46	Insulator	CNM3158
4	Panel (EW)	CNB1467	47	Screw	BBT30P060FMC
5	Cover	CNS2227	48	Case	CNB1470
6	Cover	CNS2211	49	Screw	PPZ30P100FZK
7	Screw	BMZ30P100FMC	50	Screw (EW)	BMZ20PQ80FMC
8	Screw	BMZ30P080FMC	51	Connector (EW)	CKS1156
9	Screw	BMZ30P080FMC	52	Bracket	CNC3610
10	Screw	BMZ30P080FMC	53	Jack	CKB1007
11	Bracket	CNC3425	54	Screw	BMZ30P080FMC
12	Bracket	CNC3424	55	Screw	BMZ30P100FMC
13	Transistor	2SD1707	56	Bracket	CNC3425
14	Transistor	2SB1156	57	Transistor	2SC1568
15	Transistor	2SC1568	58	Transistor	2SD1707
16	Diode	RBV-602L	59	Transistor	2SB1156
17	FET	2SK1191	60	Heat Sink	CNC3441
18	Heat Sink	CNC3441	61	Screw	BMZ30P050FMC
19	Heat Sink	CNC3442	62	Thermister	CCK1010
20	Screw	BBZ30P100FMC	63	Cord Assy	CDE3019
21	Auto Fuse Holder	CKR1004	64	Cord Assy (EW)	CDE3308
22	Terminal	CKE1019	65	Resistor (EW)	RS1/2P102JL
23	Terminal	CKE1018	66	Cap (EW)	CNS1472
24	Bracket	CNC3609	67	Fuse (EW)	CEK1134
25	Screw	PPZ20P080FZK	68	Cord Assy (EW)	CDE3032
26	Screw	PPZ30P100FZK	69	Cord (EW)	CDE3025
27	Screw	BBZ30P050FMC	70	Cord (EW)	CDE3027
28	Fuse	CEK1140	71	Fuse (EW)	CEK1140
29	Panel (EW)	CNB1438	72	Auto Fuse Holder (EW)	CKR1006
30	Screw (EW)	BBZ30P050FMC	73, 74		
● 31	Volume Unit (UC)	CWG1031	75	Cord Assy (UC)	CDE3164
	Volume Unit (EW)	CWG1030	76	Cord (UC)	CDE3025
32	Plug	CKS1039	77	Cord (UC)	CDE3163
33	Plug (EW)	CKS1039	78	Fuse (UC)	CEK1117
34	Plug	CKS1045	79	Shield	CNC3862
● 35	Amp Unit (UC)	CWH1114	80	Cord Assy (UC)	CDE3309
	Amp Unit (EW)	CWH1113	81	Panel (UC)	CNB1469
36	Holder	CNC3611	82	Screw (UC)	BBZ30P050FMC
37			83	Panel (UC)	CNB1468
38	Connector	CDE3194	84	Screw (UC)	BBZ30P050FMC
39	Connector (EW)	CDE3194			
40	Connector	CDE3195			
41	Plug	CKS1821			
42	Holder	CNC3612			

14. PACKING METHOD

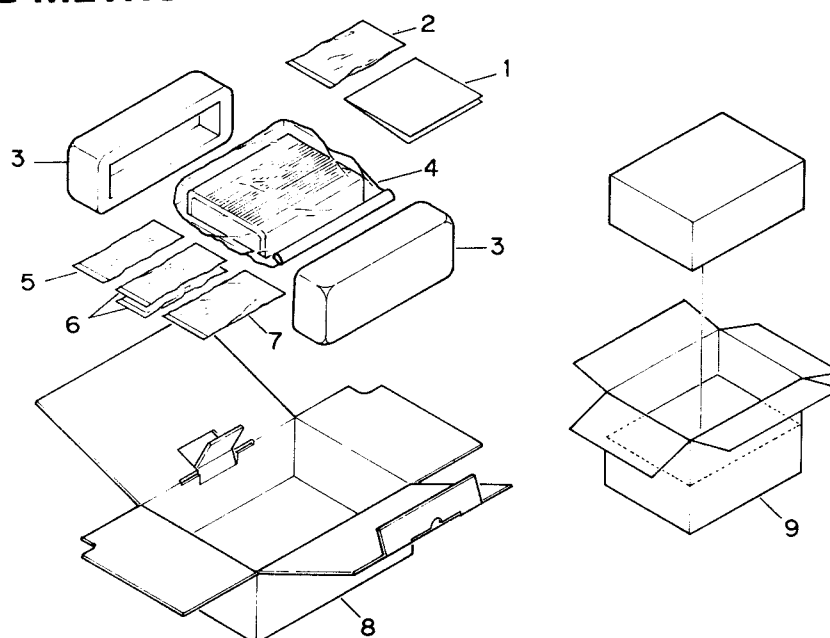


Fig. 11

● Parts List

NSP: Non Spare Part

Mark No.	Description	GM-H120/UC	GM-3400/EW
		Part No.	Part No.
1-1	Owner's Manual	CRD1454	CRD1452
	Owner's Manual		CRD1453
1-2	Card	NSP	
	Card		NSP
2	Accessory Assy	CEA1652	CEA1652
2-1	Screw Assy	NSP	NSP
2-1-1	Screw (× 4)	HYC50P650FZX	HYC50P650FZX
2-2	Cover (× 2)	CNS2211	CNS2211
2-3	Cover	CNS2227	CNS2227
2-4	Driver	CNV2697	CNV2697
3	Styrofoam	CHP1397	CHP1397
4	Cover	CEG1100	CEG1100
5	Cord Assy	CDE3309	CDE3308
6	Cord Assy	CDE3019	CDE3019
7	Cord Assy	CDE3164	CDE3032
7-1	Cord	CDE3025	CDE3025
7-2	Cord	CDE3163	CDE3027
8	Carton	CHG1977	CHG1976
9	Contain Box	CHL1977	

* Owner's Manual

Part No.	Model	Language
CRD1454	UC	English, French
CRD1452	EW	English, French, German, Spanish
CRD1453	EW	Swedish, Norwegian, Dutch, Italian, Finnish

15. ELECTRICAL PARTS LIST

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/8S□□□J, RS1/10S□□□J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

● GM-H120/UC

Unit Number :

Unit Name : Volume Unit

MISCELLANEOUS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
IC	302	303		UPC4570HA	
D	301			PR3432S	
VR	301	302	Volume 10kΩ (A)	CCS1174	

RESISTORS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
R	301	302	303	304	RD1/4PS271JL
R	305	306	307	308	RD1/4PS473JL
R	309	310	311	312	RD1/4PS473JL
R	313	314	315	316	RD1/4PS392JL
R	319	320			RD1/4PS331JL

CAPACITORS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
C	301	302	303	304	CCPSL220J50L
C	305	307			CEWAS470M10
C	306	308			CEWAS101M10
C	309	310			CQFA473J50L

Unit Number :

Unit Name : Amp Unit

MISCELLANEOUS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
IC	1	2	201	202	UPC4570HA
IC	451				TA8194Z
IC	452				UPC494C
Q	1	2	201	202	2SA1048
Q	3	4	203	204	2SC3327
Q	7	8	207	208	2SA1145
Q	9	10	209	210	2SC2705
Q	11	12	211	212	2SC1568
Q	13	14	213	214	2SC3421
Q	15	16	215	216	2SA1358
Q	17	18	217	218	2SD1707
Q	19	20	219	220	2SB1156
Q	21	22	221	222	2SD1768S
Q	406	407	408		2SD1864
Q	409	468			2SB1243
Q	451	452	453	454	2SK1191
Q	455	457			2SC3422
Q	456	458			2SA1359
Q	460				2SC3113
Q	461	465	466		2SC2458
Q	467				2SA1199S
D	1	2	201	202	1SS133
D	3	203	459	461	ERA15-02VH
D	401	403			HZS982L
D	402	404			HZS682L

Mark ===== Circuit Symbol & No. ===== Part Name Part No.

D	412	413			RD16JSB1
D	451				RBV-602L
D	452	454	455	458	1SS133
D	453				RD9R1JSB2
D	456				RD6R8JSB2
D	457				RM4Z
D	462				HZ30P
L	1	2	201	202	Coil
L	451	452			Choke Coil
L	454				Coil 100μH
L	455				Coil
T	451				Transformer
RY	1	201			Relay
TH	451				Thermistor
SW	1				Switch (BFC)
VR	1	2	201	202	Semi-fixed 1.5kΩ (B)
EF	401	402			EMI Filter
FU	1				Fuse 30A

RESISTORS

Mark ===== Circuit Symbol & No. ===== Part Name Part No.

R	1	2	57	58	201	202	257	258	490	RD1/4PS222JL
R	5	6	205	206	475	484				RD1/4PS104JL
R	7	8	207	208						RD1/4PS274JL
R	9	10	11	12	209	210	211	212		RD1/4PS471JL
R	13	14	213	214						RD1/4PS681JL
R	15	16	33	34	215	216	233	234		RD1/4PS103JL
R	17	18	217	218						RD1/4PS104JL
R	31	32	35	231	232	235	489			RD1/4PS471JL
R	36	37	236	237						RD1/4PS363JL
R	39	40	41	42	239	240	241	242		RD1/4PS153JL
R	43	44	45	46	243	244	245	246		RD1/4PS681JL
R	47	48	49	50	247	248	249	250		RD1/4PS473JL
R	51	52	53	54	251	252	253	254		RD1/4PS161JL
R	55	56	255	256	416	417				RD1/4PS472JL
R	59	60	61	62	259	260	261	262		RD1/4PS473JL
R	63	64	263	264	492					RD1/4PS221JL
R	65	66	67	68	265	266	267	268		RD1/4PS100JL
R	69	70	71	72	73	74	75	76	0.22Ω/2W	CCN1013
R	77	78	277	278						RD1/4PS393JL
R	79	80	81	82	279	280	281	282		RN1/2P100JL
R	83	84	283	284						RD1/4PS564JL
R	85	86	285	286						RD1/4PS473JL
R	269	270	271	272	273	274	275	276	0.22Ω/2W	CCN1013
R	410	481								RD1/4PS223JL
R	412	414	491							RD1/4PS152JL
R	413	415	463	464						RD1/4PS332JL
R	451	452								RD1/4PM100J
R	453	454								RS1/2P220JL
R	455	456	469	470	474	476	478	485	498	RD1/4PS472JL
R	457									RD1/4PS273JL

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
R	458	465 479 483			RD1/4PS153JL
R	459	460 461 462			RD1/4PS820JL
R	466				RD1/4PS105JL
R	467				RD1/4PS102JL
R	468				RD1/4PS682JL
R	477				RD1/4PS124JL
R	480	482			RD1/4PS182JL
R	486				RD1/4PS822JL
R	487				RD1/4PS331JL
R	488				RD1/4PS123JL
R	493				RD1/4PS103JL
R	499				RD1/4PS182JL
R	500				RD1/4PS183JL

CAPACITORS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
C	1	2 201 202			CEZA2R2M50
C	3	33 34 203 233 234			CKCYB102K50
C	5	6 7 8 205 206 207 208			CEZA470M10
C	11	12 211 212			CCPSL470J50L
C	13	14 15 16 213 214 215 216			CCPSL330J50L
C	17	18 19 20 217 218 219			CCPSL220J50L
C	21	22 23 24 221 222 223 224			CQFAH224J50L
C	25	26 225 226			CQFA223J50L
C	27	28 29 30 227 228 229 230			CQFA333J50L
C	31	32 231 232			CEA222M25L2
C	35	235 401 404			CEA101M10L2
C	220				CCPSL220J50L
C	402	405			CEA331M6R3L2
C	403	406			CEA471M6R3L2
C	411	412 413 414 463			CEA470M16L2
C	451	452			CEA471M25L2
C	453	454	4700 μ F/25V		CCH1103
C	455	456	4700 μ F/16V		CCH1104
C	457	458			CQMA223J50
C	459	469			CEA101M16L2
C	460				CQPA102J2A
C	461				CEA2R2M50L2
C	464	465 472			CKCYF473Z50
C	466		470 μ F/16V		CCH-114
C	467				CEA4R7M35L2
C	468				CEA220M16L2
C	470		220 μ F/10V		CCH1036
C	473				CEA102M16L2
C	479	480			CKCYF473Z50

● GM-3400/EW

Unit Number :
Unit Name : Volume Unit

MISCELLANEOUS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
IC	301				TC4066BP
IC	302	303			UPC4570HA
Q	301				2SC2458
D	301				PR3432S
VR	301	302	Volume 10k Ω (A)		CCS1174
VR	303	304	Volume 10k Ω (C)		CCS1175

RESISTORS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
R	301	302 303 304			RD1/4PS271JL
R	305	306 307 308			RD1/4PS102JL
R	309	310 311 312			RD1/4PS273JL
R	313	314 315 316			RD1/4PS392JL
R	317	318			RD1/4PS472JL
R	319	320			RD1/4PS331JL

CAPACITORS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
C	301	302 303 304			CCPSL220J50L
C	305	307			CEWAS470M10
C	306	308			CEWAS101M10
C	309	310			CQFA473J50L

Unit Number :
Unit Name : Amp Unit

MISCELLANEOUS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
IC	1	2 201 202			UPC4570HA
IC	401				TC4066BP
IC	451				TA8194Z
IC	452				UPC494C
Q	1	2 201 202 410 411 462 463 464			2SA1048
Q	3	4 5 6 203 204 205 206			2SC3317
Q	7	8 207 208			2SA1145
Q	9	10 209 210			2SC2715
Q	11	12 211 212			2SC1518
Q	13	14 213 214			2SC341
Q	15	16 215 216			2SA1318
Q	17	18 217 218			2SD1717
Q	19	20 219 220			2SB1156
Q	21	22 221 222			2SD1748S
Q	401	402 403 404 459 461 465 466 470			2SC2418
Q	405	406 407 408			2SD1814
Q	409	468 469			2SB1213
Q	451	452 453 454			2SK1111
Q	455	457			2SC3412
Q	456	458			2SA1319
Q	460				2SC3113
Q	467				2SA1119S
D	1	2 201 202 406 407 408 409 410 411			1SS131
D	3	203 459 460 461			ERA15-02VH
D	401	403			HZS981L
D	402	404			HZS681L
D	405				RD12J1B1
D	412	413			RD16J1B1
D	451				RBV-612L
D	452	454 455 458			1SS131

Mark ===== Circuit Symbol & No. ===== Part Name Part No.

D 453
D 456
D 457
D 462
L 1 2 201 202 Coil
L 451 452 Choke Coil
L 454 Coil 100 μ H
L 455 Coil
T 451 Transformer
RV 1 201 Relay
TH 451 Thermistor
SW 1 Switch (BFC)
VR 1 2 201 202 Semi-fixed 1.5k Ω (B)
SW 2 Switch (DRIVE MODE)
EF 401 402 EMI Filter
FU 1 Fuse 30A

RD9R1JSB2
RD6R8JSB2
RM42
H230P
CTH1028
CTH1027
CTF-113
CTH1086
CTT1015
CSR1010
CCX1010
HSH-156
VRTB6VS152
CSH1025
CCG-081
CEK1140

RESISTORS

Mark ===== Circuit Symbol & No. ===== Part Name Part No.

R 1 2 57 58 201 202 257 258 490 497 RD1/4PS222JL
R 5 6 205 206 475 484 RD1/4PS104JL
R 7 8 207 208 RD1/4PS274JL
R 9 10 11 12 209 210 211 212 RD1/4PS471JL
R 13 14 213 214 RD1/4PS182JL
R 15 16 33 34 215 216 233 234 RD1/4PS103JL
R 17 18 25 26 217 218 225 226 RD1/4PS104JL
R 19 20 219 220 467 RD1/4PS102JL
R 21 22 221 222 RD1/4PS223JL
R 23 24 223 224 RD1/4PS563JL
R 31 32 35 231 232 235 489 RD1/4PS471JL
R 36 37 236 237 RD1/4PS183JL
R 39 40 41 42 239 240 241 242 RD1/4PS153JL
R 43 44 45 46 243 244 245 246 RD1/4PS681JL
R 47 48 49 50 247 248 249 250 RD1/4PS473JL
R 51 52 53 54 251 252 253 254 RD1/4PS161JL
R 55 56 255 256 407 408 416 417 418 RD1/4PS472JL
R 59 60 61 62 259 260 261 262 RD1/4PS473JL
R 63 64 263 264 492 RD1/4PS221JL
R 65 66 67 68 265 266 267 268 RD1/4PS100JL
R 69 70 71 72 73 74 75 76 0.22 Ω /2W CCN1013
R 77 78 277 278 RD1/4PS393JL
R 79 80 81 82 279 280 281 282 RN1/2P100JL
R 83 84 283 284 RD1/4PS564JL
R 85 86 285 286 406 RD1/4PS473JL
R 259 270 271 272 273 274 275 276 0.22 Ω /2W CCN1013
R 401 405 473 493 494 495 RD1/4PS103JL
R 402 RD1/4PS222JL
R 403 RD1/4PS393JL
R 404 413 415 463 464 RD1/4PS332JL
R 409 410 411 481 RD1/4PS223JL
R 412 414 491 RD1/4PS152JL
R 419 499 RD1/4PS182JL
R 451 452 RD1/4PM100J
R 453 454 RS1/2P220JL
R 455 456 469 470 474 476 478 485 496 498 RD1/4PS472JL
R 457 RD1/4PS273JL
R 458 465 479 483 RD1/4PS153JL
R 459 460 461 462 RD1/4PS820JL
R 466 RD1/4PS105JL
R 468 RD1/4PS682JL
R 472 480 482 RD1/4PS182JL
R 477 RD1/4PS124JL
R 486 RD1/4PS822JL
R 487 RD1/4PS331JL

Mark ===== Circuit Symbol & No. ===== Part Name Part No.

R 488 RD1/4PS123JL
R 500 RD1/4PS183JL

CAPACITORS

Mark ===== Circuit Symbol & No. ===== Part Name Part No.

C 1 2 201 202 CE2A2R2M50
C 3 203 CKCYB472K50
C 5 6 7 8 205 206 207 208 CE2A470M10
C 9 10 209 210 CE2A100M16
C 11 12 211 212 CKPYB101K50L
C 13 14 15 16 213 214 215 216 CCPSL330J50L
C 17 18 19 20 217 218 219 CCPSL220J50L
C 21 22 23 24 221 222 223 224 CQFAH224J50L
C 25 26 225 226 CQFA223J50L
C 27 28 29 30 227 228 229 230 CQFA333J50L
C 31 32 231 232 CEA222M25L2
C 33 34 233 234 CKCYB102K50
C 35 235 401 404 CEA101M10L2
C 220 CCPSL220J50L
C 402 405 CEA331M6R3L2
C 403 406 CEA471M6R3L2
C 407 408 411 412 413 414 463 CEA470M16L2
C 409 CEA100M16L2
C 451 452 CEA471M25L2
C 453 454 4700 μ F/25V CCH1103
C 455 456 4700 μ F/16V CCH1104
C 457 458 CQMA223J50
C 459 469 CEA101M16L2
C 460 CQPA102J2A
C 461 CEA2R2M50L2
C 464 465 472 CKCYF473Z50
C 466 CCH-114
C 467 CEA4R7M35L2
C 468 CEA220M16L2
C 470 220 μ F/10V CCH1036
C 473 CEA102M16L2
C 475 CKCYF223Z50
C 476 477 478 CKCYF473Z50
C 479 480 CKCYF473Z50